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Galvanizing Plant Handles Large Work

Kettle of 100-Ton Spelter Capacity, Gas and Coke Fired—Side Thrust Braces and Their Design—Details of Process

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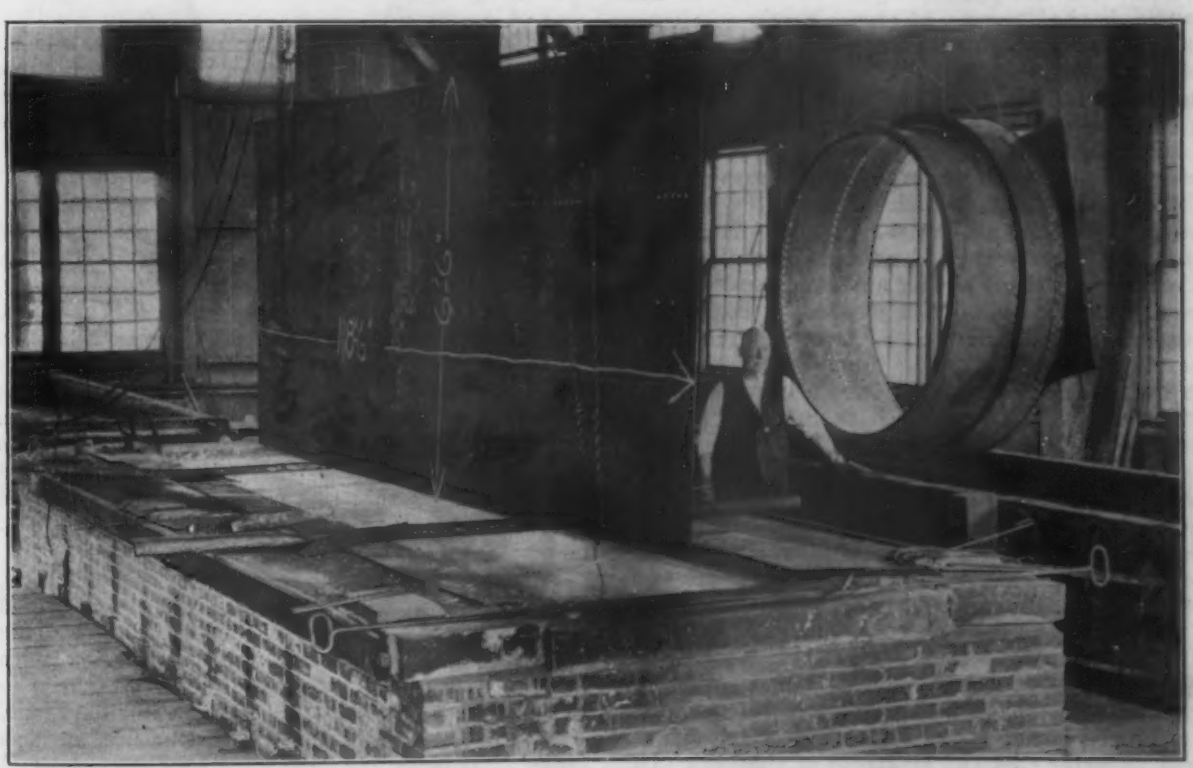
A PLANT designed for galvanizing large steel parts by the hot process for vessels of the United States Navy, was built during the war at the works of the Wellman-Seaver-Morgan Co., Akron, Ohio. The extreme dimensions of material which can be handled are 19 ft. 6 in. in length, 3 ft. 4 in. in width and 7 ft. in height. In the case of steel plates the length can be increased to 20 ft.

The hot galvanizing or zinc process for the protection of metals against corrosion consists, essentially, of thoroughly cleaning the article to be coated of all rust, scale, grease, etc., and then passing it through a flux into a molten bath of zinc, or spelter, as it is generally called. After being in the zinc the proper length of time for the coating to thoroughly adhere, the article is removed and left to cool.

The parts to be galvanized can be worked into shape before or after galvanizing, depending on the size or the final shape into which they are to be made. For instance, steel plates, 18 ft. 6 in. long by 6 ft. 6 in. wide by ¼ in. or so in thickness, are galvanized before rolling, while plates of a lesser width may be rolled first and miscellaneous parts riveted thereto before galvanizing. Steel tanks 3 ft. 4 in. wide by 6 ft. 6 in. high by 7 ft. 6 in. long, made of ¼-in. plate and angles have been galvanized inside and outside as one unit, or again, the various parts have been worked into shape, galvanized, and then assembled. Steel pipe is bent to shape before galvanizing.



Material 19½ Ft. Long, Over 3 Ft. Wide and 7 Ft. High Can Be Hot Galvanized in This Kettle of 100-Ton Spelter Capacity. Rupture of the side walls by the pressure due to the great weight of the spelter was remedied by the installation of specially designed cast-iron braces

The article, whatever its shape, must first be thoroughly cleaned before being immersed in the pickling or cleaning solutions. Marking paint, if present, must be removed by a wire brush or a cleaning agent such as lye, or by the use of both. If there is heavy rust its removal can be accelerated by using a wire brush before immersing.

The pickling solution is composed of sulphuric

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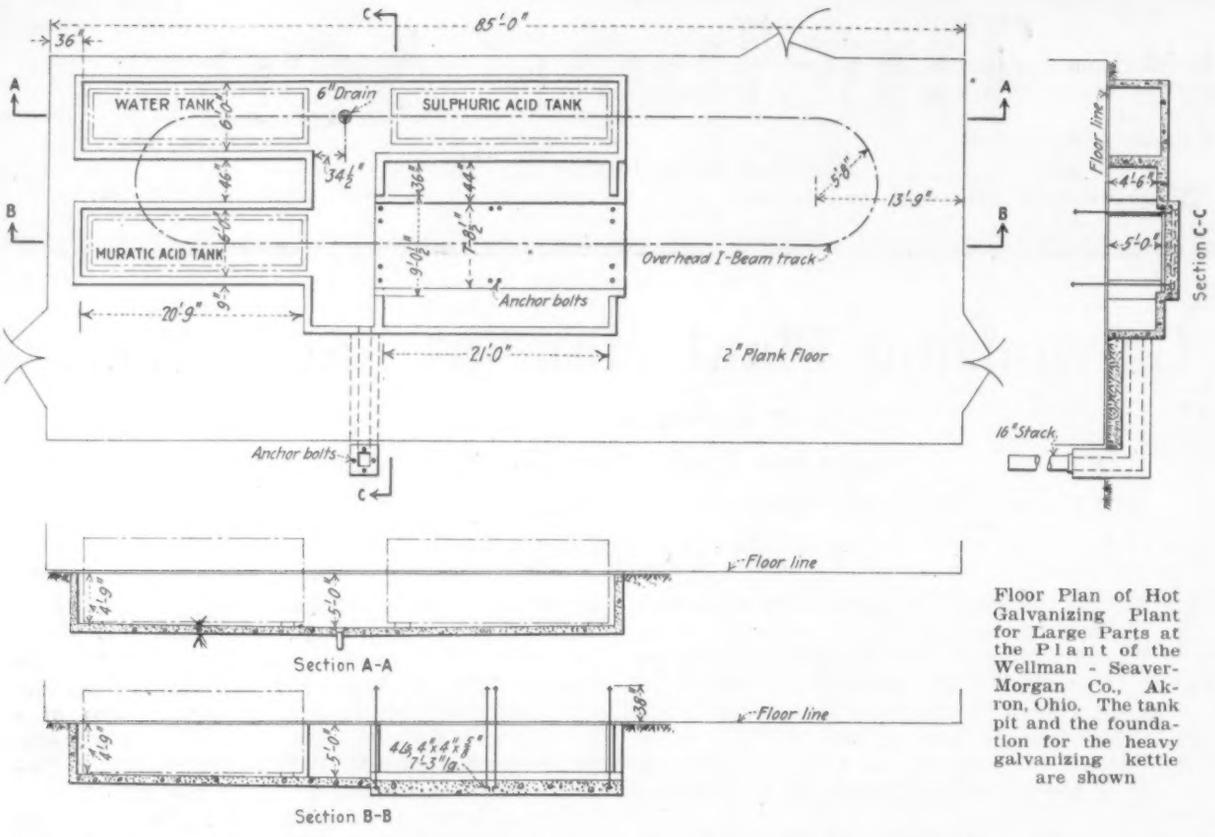


Floor Plan of Hot Galvanizing Plant for Large Parts at the Plant of the Wellman - Seaver-Morgan Co., Akron, Ohio. The tank pit and the foundation for the heavy galvanizing kettle are shown

acid and water in a proportion of about 1 to 15 by weight. An average of 75 lb. of acid, 66 deg. Baume, is used per ton of steel. A new solution is made up about once in three months, the solution being strengthened in these intervals according to the amount of metal pickled. The acid is received in carboys, each containing, approximately, 200 lb. A hot bath is used to accelerate pickling, the heat being supplied by steam coils placed on the bottom of the pickling tank, which maintain the temperature of the bath at about 100 deg. Fahr. The artilcle must be kept in this pickling solution until all rust is removed, without having any action on the metal itself. The moment when pickling is complete is best indicated by experience. Over-pickling can be ascertained by the fibres of the metal being visible. An over-pickled article will take a heavier coat of zinc when galvanized, which is liable to peal off through vibration.

From the pickling tank the article is taken to the wash water or rinse tank for the removal of the sulphuric acid which is detrimental to galvanizing. The wash tank is also used as a storage tank when pickled articles are to be held for a short time before galvanizing. The water in the wash tank is also kept hot by steam coils, so that the articles will keep warm and thus dry faster.

After washing, the article is immersed in the muriatic acid tank, which contains acid and water in a proportion of about 1 to 15 by weight. This removes water rust and all traces of sulphuric acid. This solution is also kept hot by the use of a steam coil. An average of 75 lb. of muriatic acid is used per ton of steel. A new bath is made up about every three months and is strengthened at intervals as required. Muriatic acid is received in carboys containing 125 lb. of 18 deg. Baume acid, each.

The article may now be placed over the galvanizing kettle where radiated heat thoroughly dries it, before immersing in the bath of molten zinc (spelter). This practise may vary somewhat, according to the nature of the part to be galvanized; a steel plate 18 ft. 6 in. long by 6 ft. 6 in. wide by ¼ in. thick, before being placed over the galvanizing kettle to dry, is sprinkled with fine salammoniac which forms a flux when the sheet is being immersed in the zinc. It takes four men to handle a sheet of this size, two at the rope blocks, one on each side of the kettle to skim zinc oxide and one to handle salammoniac. After the sheet is thoroughly dry and before immersing, the surface of the zinc bath is thoroughly skimmed of zinc oxide, after which the sheet is immersed at the rate of about 10 ft. per minute. The zinc becomes greatly agitated at the points of immersion, the sheet not being withdrawn for examination for several moments after this agitation ceases. In withdrawing, the sheet is scanned closely for spots that may not be coated. If any are found, salammoniac is thrown on them and the sheet again immersed. Withdrawing is done at the same speed as immersion. If the sheet is found to be thoroughly coated, it is taken to one side and laid down to cool, after which it is sent to the erecting department. Better results are secured by this method than by passing the sheet through a prepared bath of flux (molten salammoniac) during immersion.

A difficult piece to galvanize is the steel tank, shown in an accompanying illustration, which had to be thoroughly coated both inside and out. This was accomplished by thoroughly sprinkling with salammoniac after leaving the muriatic acid solution and before drying over the galvanizing kettle. Articles of a more or less enclosed nature, such as tanks, bent pipes, etc., are sometimes very dangerous to galvanize by the hot method unless proper precautions are taken as regards vents, which will permit any steam or gas to escape that may be caught in a pocket. The method of passing articles through a coat of flux, while immersing, is used for small miscellaneous parts only.

Salammoniac, or ammonium chloride, is received in crystal form in hogsheads containing about 720 lb. each, and contains about 8 per cent moisture. It melts when thrown on molten zinc, and gradually dissolves some of the zinc oxide until it becomes an impure and sticky mass. This is skimmed off and sold as salammoniac skimmings

to chemical manufacturers. In galvanizing large sheets and tanks, an average of 5 lb. is used per ton of steel.

Zinc or spelter is received in 50-lb. pigs of the following composition, in per cent: Zinc 99.77, lead 0.19, iron 0.04. This is an exceptionally good grade of spelter. The amount of zinc per sq. ft. of surface galvanized averages from one to two ounces, depending on the texture of the metal to be coated and the length of time immersed. The working temperature of the bath is about 800 deg. Fahr., depending on the gage of steel being galvanized, light gage steel requiring a somewhat higher temperature. A pyrometer is used for determining the temperature of the molten spelter. A great improvement can be made in the appearance of galvanized surfaces by adding a very little aluminum to the molten bath.

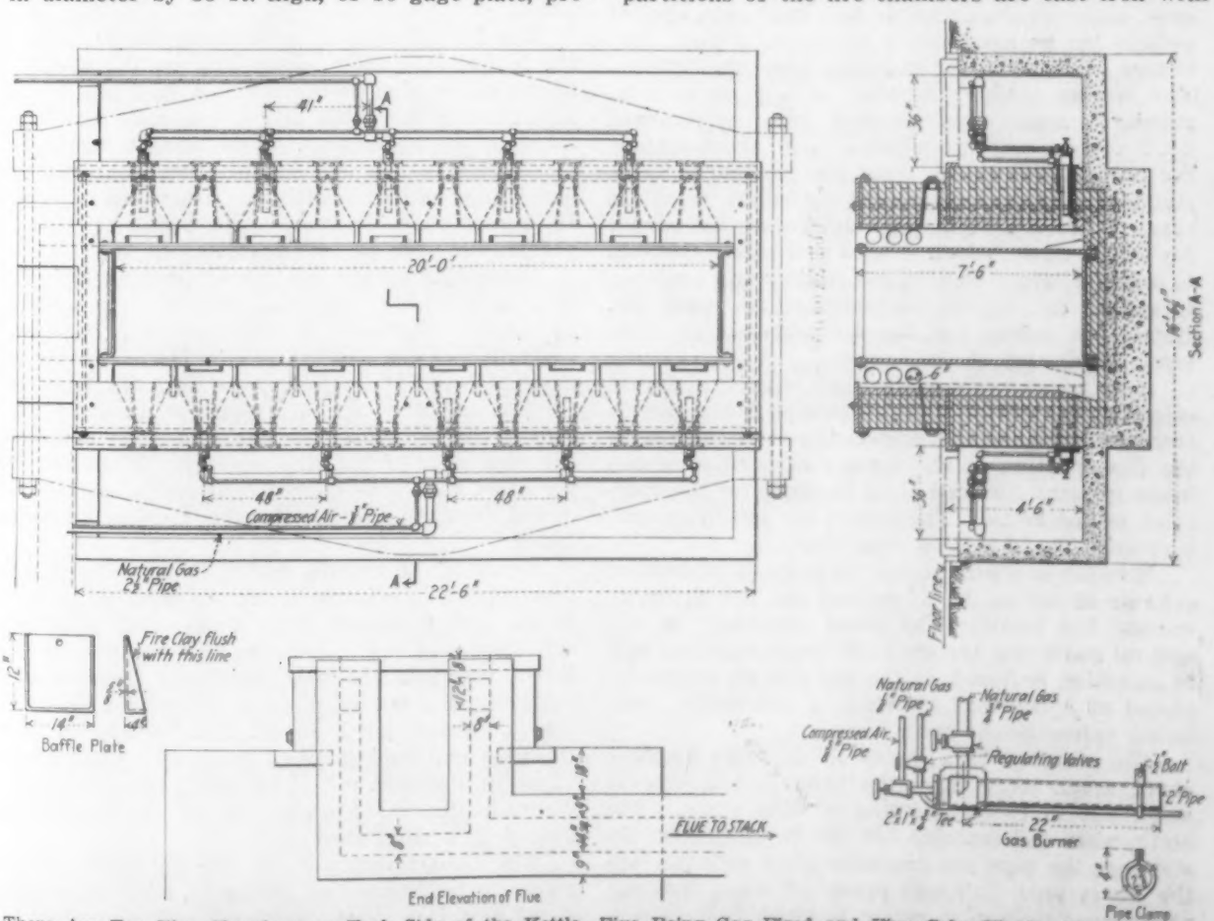
Zinc oxide (oxide ashes) is formed on the surface of the molten zinc by its contact with the atmosphere when a prepared bath of flux is not used. It is a scum and must be skimmed back before the articles are immersed. In galvanizing, some sal-ammoniac (chloride of ammonia) combines with the zinc ashes. These are sold to chemical manufacturers for the extraction of the chloride of ammonia.

A floor plan of the galvanizing plant showing the tank pit and the foundation for the galvanizing kettle is shown in an accompanying line drawing. The pit and foundation are concrete. The pit floor has a slope of ⅛ in. per ft. toward a 6-in. drain. The pit bottom and sides for a distance of 1 ft. in height are coated with light grade pyrolite, so as to protect the concrete from the action of acid from the tanks. The flue for the fire chambers of the galvanizing kettle is of common brick and leads to the outside of the building. A steel stack 16 in. in diameter by 35 ft. high, of 16 gage plate, provides an exit for the fumes from the gas burners. This stack is anchored to the flue by four ¾-in. anchor bolts, 18 in. long, and is also braced to the eave of the roof. An 8-in. I-beam overhead track is fastened to the roof trusses and passes over the center lines of the galvanizing kettle and tanks. This track contains two 1-ton chain hoists and two ½-ton rope blocks.

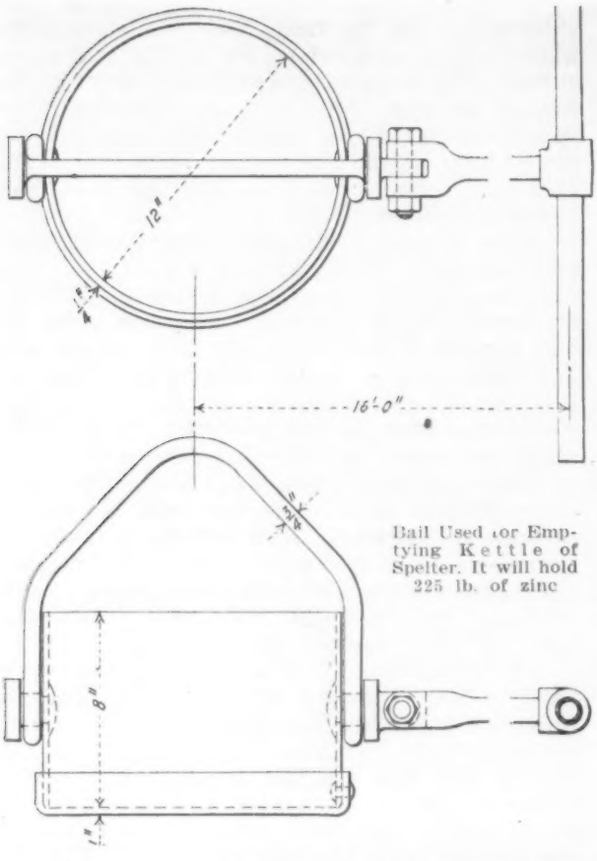
There are two acid tanks and one water tank, each measuring inside, 19 ft. x 4 ft. x 7 ft. deep. The two acid tanks are of 6-in. double-keyed Oregon fir, heavily braced and bolted with steel bolts and nuts encased in lead to protect them against acid. The water tank is of 3-in. Oregon fir. The acid tanks were built of the heavier material as previous experience proved that the lighter tanks would not stand up under the service demanded. All joints are made with white lead. The tanks are so located as to be in line with the various stages of the process. Each contains a steam coil composed of 1-in. lead pipe, about 50 ft. long, laid around the bottom with both ends coming up over the top of the tank to the steam main. There is an inlet and outlet valve at the top of each tank.

The galvanizing kettle has inside dimensions of 20 ft. x 3 ft. 6 in. x 7 ft. 6 in. deep. The side plates are 1¼-in. fire-box steel, and end plates and bottom plate 1-in. flange or boiler steel. The 1¼-in. fire-box steel has a tensile strength of 52,000 to 62,000 lb. per sq. in., a yield point not less than 50 per cent of the tensile strength, and an elongation in 8 in. of not less than 24 per cent. The 1-in. flange or boiler steel has a tensile strength of 55,000 to 65,000 lb. per sq. in., a yield point of not less than 50 per cent of the tensile strength, and an elongation in 8 in. of not less than 24 per cent.

There are ten fire chambers on each side of the kettle, five being gas fired and five coke fired. The partitions of the fire chambers are cast iron with



There Are Ten Fire Chambers on Each Side of the Kettle, Five Being Gas Fired and Five Coke Fired. The partitions of the fire chamber are cast iron, with three 6-in. holes for the passage of the fumes to the flue. The cast-iron braces installed to prevent rupture due to the pressure of the molten spelter are shown by dotted lines



Bail Used for Emptying Kettle of Spelter. It will hold 225 lb. of zinc

three holes, 6 in. in diameter, for the passage of gas fumes to the flue. A sectional grating formed of 1½ x ⅜-in. rectanglar steel bars bolted together with ½-in. bolts and pipe spacers is used for a grating over the fire pit.

The gas firing system is unique in that it is the only one of the kind installed, to the writer's knowledge, although the principle may have been applied before, but perhaps not in so simple a way. The burner is made up of standard pipe and fittings. The mixing chamber consists of a piece of 2-in. standard steel pipe screwed into a standard 2 x 1 x ¾-in. tee, into which a ¾-in. standard pipe for natural gas enters from the top and a ⅜-in. standard pipe for compressed air enters from the rear. There is a ⅛-in. pipe underneath the burner for a pilot flame, which is used as a safety measure in case the burner has any gas leakage or a tendency to go out due to the admission of too much air. Regulating valves for the air and gas are conveniently located at the burner.

A cast-iron baffle plate filled with fire clay is placed at the side of the galvanizing kettle and in front of the burner to protect the steel plate from the direct action of the flame. Either one of the firing systems operated alone is ample for the operation of the kettle. The covers for the fire chambers are 10 x 24 x ⅜-in steel plates.

It requires approximately 2000 lb. of by-product coke or 40,000 cu. ft. of natural gas per 24 hp. to operate the kettle. The great advantage of the natural gas firing system is its cleanliness and lack of attention required, as the gas and air are maintained at a constant pressure by automatic regulating valves in the main lines.

The starting of a kettle of this size requires about seven days from the time that spelter is being put in to the burning of zinc ashes. The kettle when full contains 200,000 lb. of spelter. In starting, the pigs are carefully piled endwise into the kettle until full and pieces of sheet iron are placed over the top to retain as much heat as possible. The gas burners are then lighted and a very low heat is maintained at first, so as to thoroughly dry out the brick work and heat the kettle gradually. More heat is applied from time to time as the spelter begins to melt and the kettle fills up. From the time of applying the heat to the time the kettle is full requires about four days.

When the kettle is full of molten spelter, there will be quite an accumulation of zinc ashes (zinc oxide) on the surface of the metal. These ashes sometimes contain considerable spelter which is melted out by throwing on several handfuls of resin which is ignited by a match or other source of flame. The burning resin creates considerable heat which melts the spelter in the ashes and allows it to trickle down into the molten spelter in the kettle. The zinc ashes are raked over with an iron rake during the burning of the resin to shorten the time of operation, and are then skimmed off. After the kettle has been cleared of zinc ashes it is ready for duty. In adding new spelter to the kettle when in operation, a good plan is to lay the pigs on the kettle cover plates, to be heated during the day and then added to the kettle in the evening. New spelter should be added frequently and in small quantities so as to not to cause sudden great changes of temperature in the bath.

While a galvanizing kettle is in operation there is a continual waste due to dross which settles to the bottom, and can be felt with an iron rod the same as sediment can be felt at the bottom of a pond of water with a stick. Dross is an alloy formed by the zinc and the iron of the kettle, about 10 per cent of the spelter being lost in this way. Galvanizing kettles are not heated at the bottom for the reason that dross can then settle and not be disturbed until removed. The dross is removed from time to time by the spoon shown in one of the illustrations, and is then packed into the cast-iron molds or pans, the pigs formed weighing 125 lb.

The life of a steel galvanizing kettle is from six to twelve months, depending on the speed of action of the zinc on the iron. A leak can happen anywhere in the kettle and is generally first indicated by the appearance of the spelter in the fire pit. When a leak does occur, the kettle may as well be dipped immediately and a new one installed. It is good policy to have a new kettle at hand to provide for such an emergency.

Depending on the location of the leak and if it is a mere trickle, temporary repairs may perhaps be made. However, if the leak is in a seam, preparations for emptying the kettle should be made at once. If the leak is not very far from the surface, the zinc can be dipped out until the surface is carried below the leak, the dross and then the remainder of the zinc removed. The zinc and the dross should be poured into molds as it is removed from the kettle, thereby making handling easier.

Should it be deemed advisable to make temporary repairs to a kettle, it may be done as follows: If the leak is caused by a small hole, a tapered soft steel plug may be driven from outside of the kettle, well into the hole, providing there is still sufficient thickness of metal to withstand the driving. A plastic patch should then be applied over the plug and held in place by a steel plate about 12 in. in diameter and ½ in. thick, the plate being dished in the center to about ¾ in. and thoroughly braced by a stout steel strut.

The plastic material for the patch should be made up beforehand as follows: First mix powdered cast iron (iron borings) and fire clay in equal proportions by volume, then add silicate of

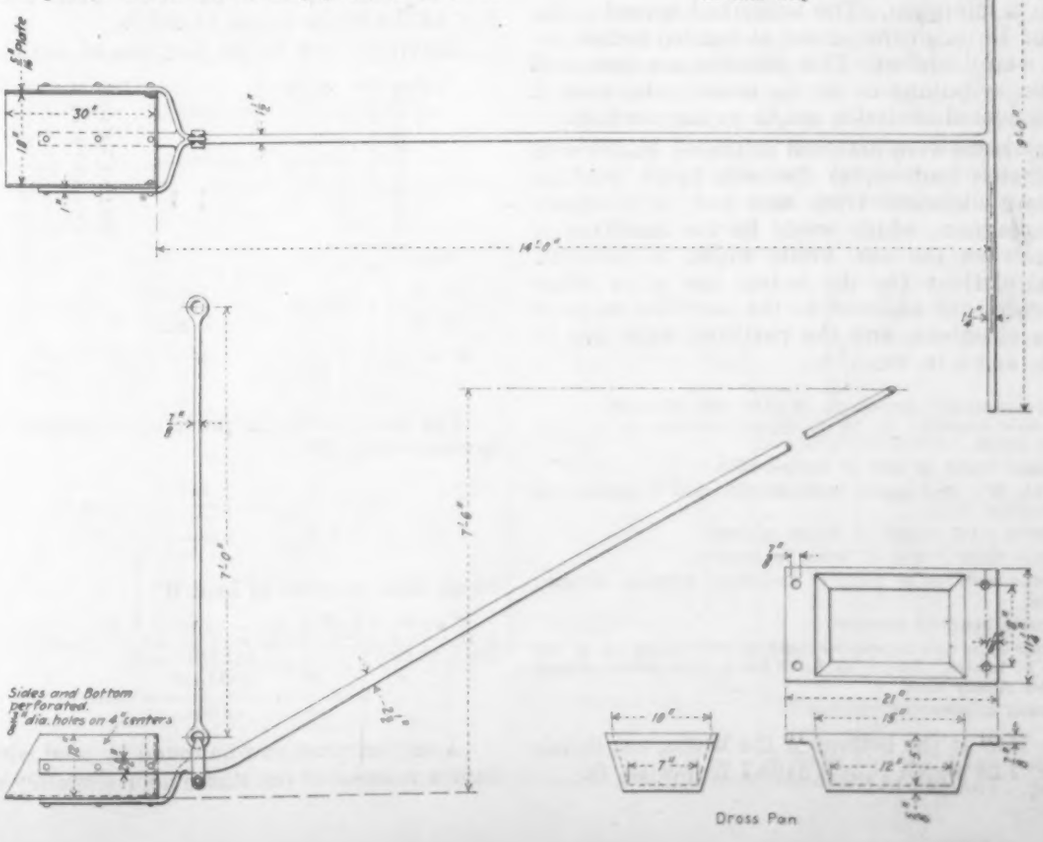
A Difficult Piece to Galvanize. This steel tank had to be thoroughly coated, both inside and out, accomplished by thoroughly sprinkling with salammoniac after leaving the muriatic acid solution and before drying over the galvanizing kettle

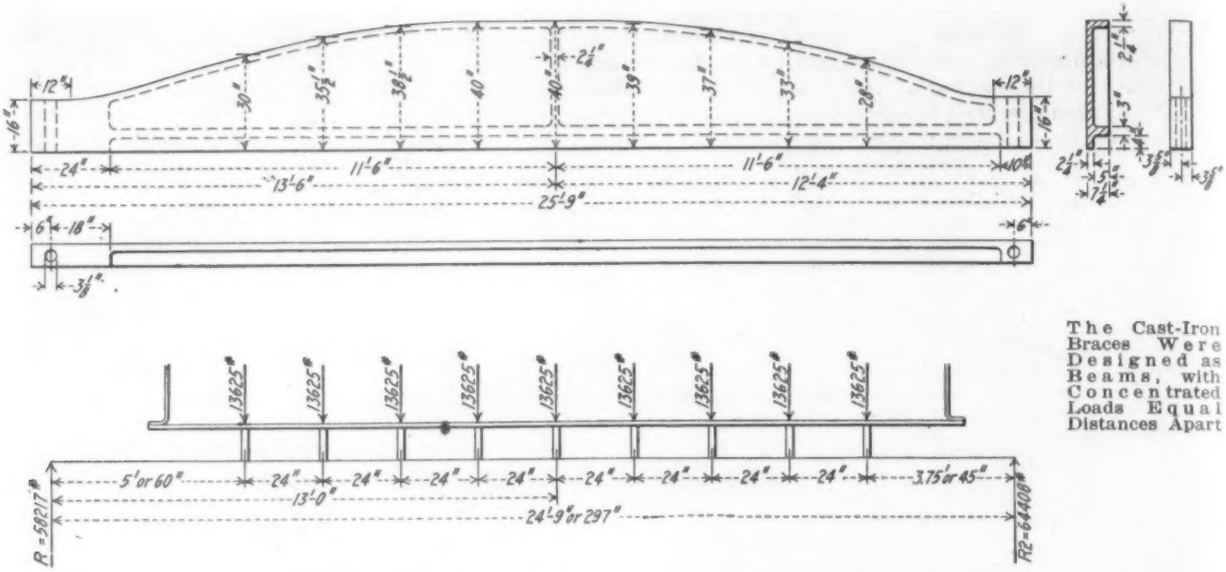
soda (water glass) and water, or sulphuric acid and water in equal parts, until a doughy mass is formed. Place this mixture around the plug and apply the steel plate and strut.

Our first kettle had been in continuous operation for a period of ten months, when a leak developed in the seam at the lower right hand corner, about 24 in. down from the top of the kettle. Preparations for dipping were made immediately and when the surface of the zinc had been lowered sufficiently so that the leak could be examined from the inside, quite a large cavity was found at the point of leakage. It required the services of six men for a period of 40 hr. to empty the kettle. A new kettle was installed and in operation at the end of 30 days. One of the accompanying illustrations shows the design of the bail used for dipping out the kettle. It will hold 225 lb. of zinc.

Zinc is in a solid state up to approximately 785 deg. Fahr. At higher temperatures it becomes a

Spoon for Removing Dross Which Settles to the Bottom of the Kettle. The dross is an alloy of the zinc and the iron of the kettle, about 10 per cent of the spelter being lost in this way





The Cast-Iron Braces Were Designed as Beams, with Concentrated Loads Equal Distances Apart

liquid and has certain physical qualities in common with all other liquids. This fact seems to have been lost sight of in some galvanizing kettle installations. The weight of cast zinc per cu. ft. is 428.1 lb., which in a liquid state is exerted in pressure in all directions. This pressure in a long deep kettle is sufficient to disrupt the entire installation if not guarded against in the form of sufficient bracing on the outside of the kettle. Such was the experience with the first kettle installed. As soon as the kettle became filled with the molten zinc, it was observed to be spreading in the center and the brick walls starting to crack. As time went on, the condition became worse, until it was evident that an exterior brace must be provided.

A pair of braces were then designed and installed, as shown by dot and dash lines in the line drawing of the kettle. The braces were later built in as part of the installation, as shown in one of the drawings, when the next kettle was installed. The braces were cast iron rather than structural steel, as they could be made quicker. The section is designed to cut the pattern shop and foundry time to a minimum. The kettle had spread a distance of 13 in. in the center at the top before the braces were installed. This distance was decreased to 10 in. by pulling up on the brace bolts, when it was considered advisable not to go any further.

The braces were designed as beams, loaded with concentrated loads equal distances apart, starting at certain distances from each end, as is shown in the diagram, which would be the condition of loading when the new kettle would be installed. The calculations for the braces are given below (the braces are adjacent to the partition walls of the fire chambers, and the partition walls are 10 in. wide and 2 in. thick):

W equals weight per cu. ft. of cast zinc, 428.1 lb.

R equals pressure to be supported per sq. ft. on side plates of kettle.

h equals depth in feet of molten zinc.

W, W^1, W^2, etc., equals concentrated load in pounds on each partition wall.

L equals total length of brace in feet.

l equals total length of brace in inches.

d equals distance to point of maximum bending moment, in inches.

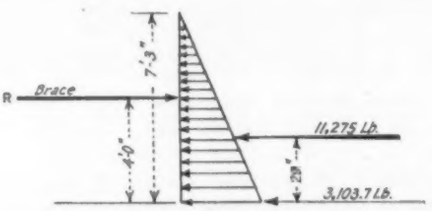
M equals bending moment.

f equals allowable tensile strength in pounds per sq. in. for material of braces. Taken as 6,000 for a good grade of cast iron under steady load.

S equals moment of resistance.

The load at the bottom of the kettle, wh, equals 428.1×7.25 which equals 3103.7 lb. per sq. ft.

A load diagram can now be made showing the zinc load on the side plates of the kettle.



Total load per lineal ft. on side of kettle $= 0.5\ wh^2 = 0.5 \times 428.1 \times 7.25^2 = 11{,}275$ lb. The center of gravity of this load being located at a point ⅓ of the depth of the zinc, from the bottom of the kettle, gives ⅓ of 7.25 ft., which equals 2.417 ft. or 29 in.

The reaction at the point of brace application R, equals $\dfrac{11{,}275 \times 2.417}{4.0}$ which equals 6812.9 lb. per lineal ft.

The load on each partition wall, $2R$ equals 2×6812.9 which equals 13,625 lb.

Referring now to the diagram of the brace:

Reaction at R^2	*Reaction at R^1*
$W \times 5$	$W \times 3.75$
$W \times 7$	$W \times 5.75$
$W \times 9$	$W \times 7.75$
$W \times 11$	$W \times 9.75$
$W \times 13$	$W \times 11.75$
$W \times 15$	$W \times 13.75$
$W \times 17$	$W \times 15.75$
$W \times 19$	$W \times 17.75$
$W \times 21$	$W \times 19.75$
Total ...117 W	Total ...105.75 W
$\dfrac{117\ W}{24.75} = 4.7272\ W$	$\dfrac{105.75\ W}{24.75} = 4.2728\ W$
$R^2 = 4.7272\ W =$ $4.7272 \times 13{,}625 =$ 64,408 lb.	$R^1 = 4.2728\ W =$ $4.2728 \times 13{,}625 =$ 58,217 lb.

The distance to the point of maximum bending moment from R^1

$$d = \frac{l}{1 + \dfrac{R^2}{R^1}} = \frac{297}{1 + \dfrac{64{,}408}{58{,}217}} = 141 \text{ in.}$$

which falls at point of load W^5

M at $W^5 = [(R^1 \times 13) - (2\ W^4 + 4\ W^3 + 6\ W^2 + 8\ W^1)] \times 12 = [(R^1 \times 13) - (20\ W)] \times 12 = [(58{,}217 \times 13) - (20 \times 13{,}625)] \times 12 = 5{,}811{,}852$ in.-lb.

$$S = \frac{M}{F} = \frac{5{,}811{,}852}{6{,}000} = 968.6$$

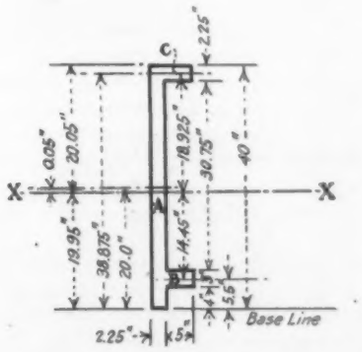
A section must now be found by trial which will have a moment of resistance approximately equal to

the above. To show the calculations necessary for determining S of a compound section, the figures are given for the section of the brace at point of load W^3. It may be well to state here the rules for finding certain elements of compound sections.

For a compound section, the position of the center of gravity may be determined by multiplying the areas of the component parts by the distances of their centers of gravity from any convenient line, taken as an axis, and dividing the sum of these products by the sum of the areas, which will give the distance of the center of gravity of the compound section from the assumed line.

The moment of inertia of a compound section about an axis through its center of gravity may be found by taking the sum of the moments of inertia of each component part about an axis through its own center of gravity, parallel to the axis of the compound section, and adding thereto the sum of the products obtained by multiplying the area of each component part by the square of the distance of its center of gravity from the axis of the compound section.

The section modulus may now be found by dividing the moment of inertia of the compound section by the distance from the neutral axis to the most remote extremity of the section.



Section at W^3

Center of Gravity of Compound Section

Area of Component Part A = 40 × 2.25 = 90.00
" " " " B = 3 × 5.0 = 15.0
" " " " C = 5 × 2.25 = 11.25

Total 116.25

Area × distance from base line to center of gravity of each component part.

Part A—90.0 × 20.0 = 1,800.0
Part B—15.0 × 5.5 = 82.5
Part C—11.25 × 38.875 = 437.3

Total 2319.8

Distance from base line to center of gravity of compound section:

$$\text{Center of Gravity} = \frac{2,319.8}{116.25} = 19.95 \text{ in.}$$

Moment of Inertia

$$\text{I of component Part A} = \frac{2.25 \times 40^3}{12} = 12,000.00$$

$$\text{I of Component Part B} = \frac{5.0 \times 3^3}{12} = 11.25$$

$$\text{I " " " C} = \frac{5 \times 2.25^3}{12} = 4.75$$

Total 12,016.00

Area of each component part × distance from center of gravity of compound section to center of gravity of each component part, squared:

Part A, 90.00 × 0.05² = 0.225
" B, 15.0 × 14.45² = 3,132.037
" C, 11.25 × 18.925² = 4,029.187

Total 7,161.450

I of section, 12,016.0 + 7,161.45 = 19,177.45.

Moment of Resistance

$$\frac{19,177.45}{20.05} = 956.4$$

This value of S is close enough for all practical purposes.

By the same method of calculation the values of M and S are found for the other points of load concentration, all values being as follows:

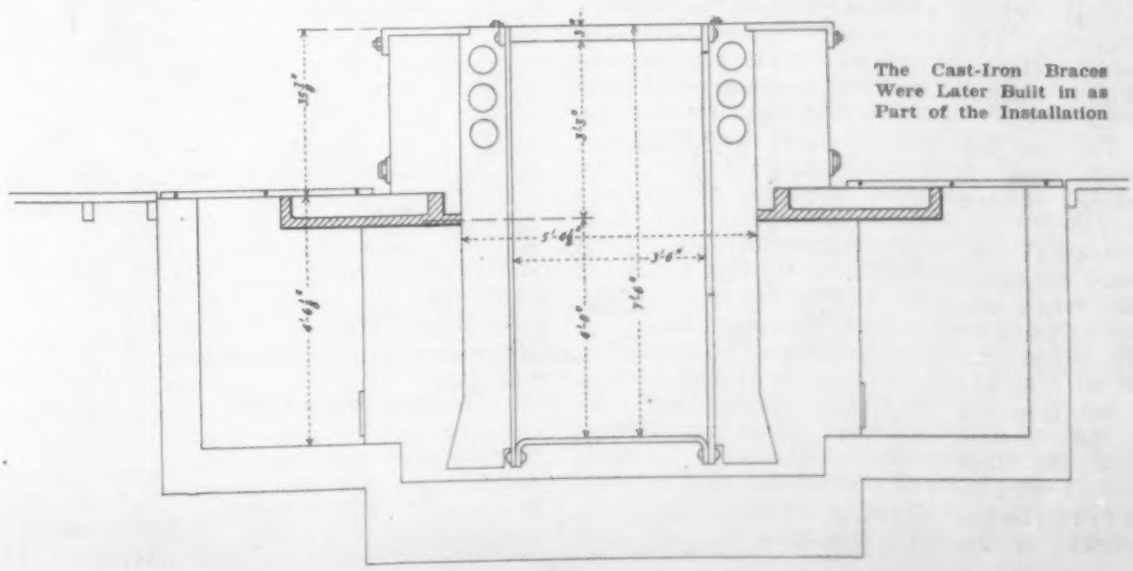
Point of Load Application	*Value of M*	*S Desired*	*Height of Section*	*S of Section Selected*
W^1	3,493,020	582.1	30	595
W^2	4,563,228	760.5	35½	773
W^3	5,306,436	884.4	38½	897
W^4	5,722,644	953.7	40	956
W^5	5,811,852	968.6	40	956
W^6	5,573,736	928.9	39	930
W^7	5,008,944	834.8	37	837
W^8	4,117,152	686.2	33	683
W^9	2,898,360	483.0	28	507

The maximum reaction is at R^1, which is 64,408 lb. Let f = 12,000 lb. per sq. in. for machine steel, then the area at root of thread

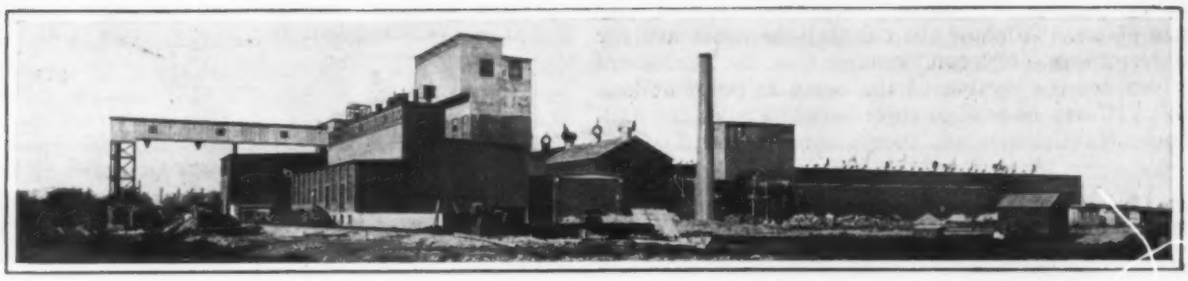
$$\frac{R^1}{f} = \frac{64,408}{12,000} = 5.37 \text{ sq. in.}$$

which requires a bolt 3 in. in diameter and having 3½ U. S. standard threads per in.

It will be noted from the foregoing that the steel plates of the kettle have not been given any credit for taking part of the molten zinc load. This is as it should be, because in a kettle of this size, the weight of the side plates alone without any load, has a tendency to bow them outward. The braces were installed in the place of the middle cast-iron plates of the first installation. The anchor bolts for holding the lengthwise top cover plates were dispensed with and the cover plates welded together at the center. Each cover plate had formerly been in two pieces. The braces have been in place for several months under the conditions for which they were designed and the entire installation now is very satisfactory.



The Cast-Iron Braces Were Later Built in as Part of the Installation



New Plant for Making Carbon Electrodes

Raw Materials Electrically Calcined and Handled Largely by Gravity at Works of Republic Carbon Co.—Details of the Process

TO meet the remarkable expansion in the manufacture of electric steel and of most ferroalloys, the demand for amorphous carbon electrodes became so insistent toward the end of the war that a marked scarcity developed. In many cases they had to be shipped by express to avoid shutting down important plants. Even then various limitations of output were unavoidable.

As a direct result of these conditions and through negotiations with the Government, the erection of a new plant was arranged. It has now been finished as the Republic Carbon Co., Niagara Falls, N. Y., and the plant is conspicuous for its completeness and thoroughly modern character. Not only are the electrodes as necessary to the manufacture of electric steel or ferroalloys as is electricity itself, but the field of application is constantly widening for they are employed in plants making carbide, carborundum, aluminous abrasives, aluminum, silicon, magnesium and other metals, and by certain chemical companies.

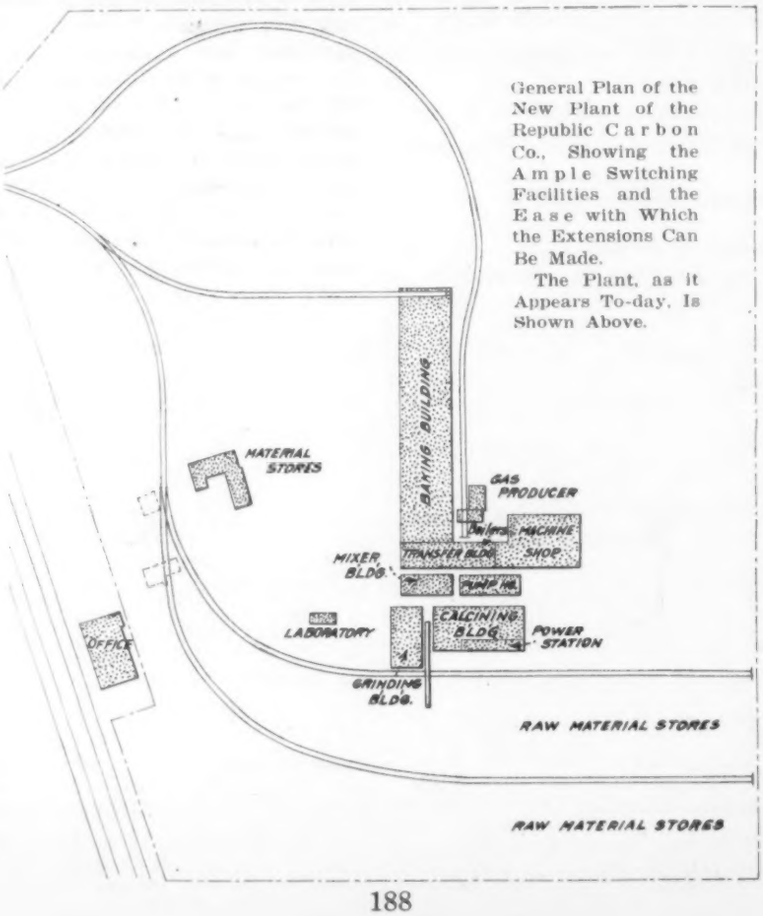
Two important features characterize this new plant: Much of the raw material is handled by gravity or mechanical lifting apparatus; the coal and coke are calcined entirely by electricity.

The raw materials used in making carbon electrodes are: Anthracite coal, coke, petroleum coke, retort carbon, hard and soft pitch, tar and oil. As can be seen from one of the illustrations, the first four of these materials are brought in by track in cars to the southern end of the plant. Here by means of a track hopper and apron conveyor they are fed into a large crusher. From this the crushed material is transferred to the calcining builder on a large Jeffrey super-carrier. The tunnel in which this conveyor or carrier operates is so constructed that a second track hopper with motors, crushers, etc., can be installed. By means of belt conveyors the raw material is placed in bunkers in the calcining building.

In specially designed electric furnaces the crushed coal or cokes are electrically calcined, thus reducing them as nearly as possible to much the same condition under which they are to function as electrodes. This is one marked advantage claimed for electric calcination. It is also said that even certain portions of the ash in the coal or cokes are removed, so high is the temperature.

The next step in the process is the grinding of the raw materials to the proper fineness. This is done in a separate building near the calcining department, as shown. Here a Raymond mill and Sturtevant crushers, as well as other grinding and crushing equipment, reduce the calcined and other raw materials. The calcined coal and cokes are brought from the electric calcining department to the grinding building by means of elevators and belt conveyors.

After the grinding is completed the various materials are elevated to the top of the mixer building by various blowing or elevating conveyors. There,



General Plan of the New Plant of the Republic Carbon Co., Showing the Ample Switching Facilities and the Ease with Which the Extensions Can Be Made.

The Plant, as it Appears To-day, Is Shown Above.

100 ft. above the ground, they are screened and then stored in a series of tanks arranged systemically for the various materials.

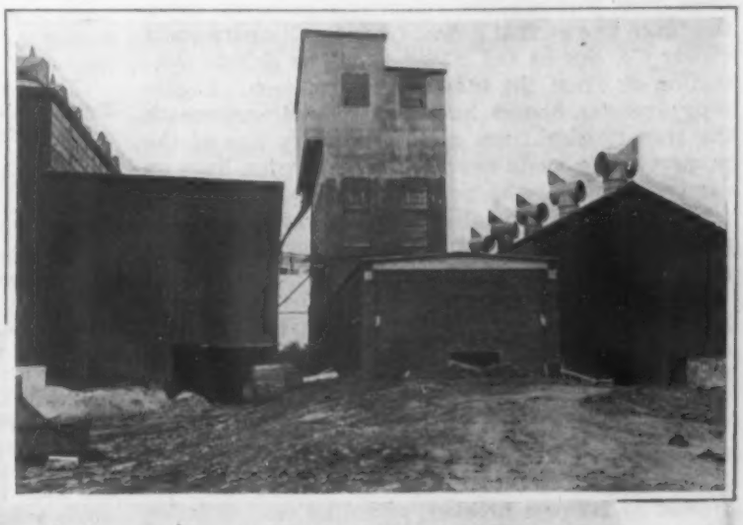
The proper mixing of the various raw materials is an extremely important part of the process. From the tanks in which the ground and screened materials are stored, the various ingredients for the carbon electrodes of certain specifications are fed by gravity into weighing cars. From these the materials then fall into specially designed mixing machines on a still lower level of this building where the various components are intimately mixed. The resulting product is then molded into cheeses or lumps of carbon with its binding material which resemble a large cheese. This is carried on in the cheese pit below.

The next step in the process is the transformation of this crude plastic material into the form of an electrode in practically the same shape in which it is to be used. A massive hydraulic press of the company's own design is used for this purpose. It is a 3000-ton press. In this machine the various cheese-like masses of prepared carbon are forced through dies of various sizes from which they are extruded in their final shape. The sizes which are to constitute the company's product embrace round electrodes of all lengths having the following diameters, 8, 9, 10, 12, 14, 16, 17, 20 and 24 in.; square electrodes, 16 and 20 in. are also included. Presses for producing additional small sizes are being installed. After the various sizes have been extruded from the presses they are piled in the transfer building as indicated.

The last stage in the manufacture of these electrodes is that of baking and annealing them. The Republic Carbon Co. has for this purpose a very striking plant. Its expanse and completeness leave nothing apparently to be desired. As can be seen it is a long building, 80 ft. wide, immediately in front of the transfer building. In fact, this structure and the lower portion of the mixer building, together with the transfer building, form one large expanse.

The major portion of this building is taken up with the baking furnaces of which there are 28 of special construction and suited to the particular problem in hand. All of these furnaces are built below the floor level and are heat-insulated on the sides and ends. They are all fired by producer gas from the gas producer building close by. They operate on the ring principle.

The green electrodes are removed by any one of three 7½-ton cranes from the transfer building or floor and placed in saggers, using coke, coal or sand as packing material. These are then placed in the various compartments of the furnaces and buried in some insulating and protective material. Pyrometric control regulates both the baking and annealing, the latter being of extreme importance following the baking.



The Mixer Building Is the Central One in the Upper Illustration. Here much of the raw material is handled by gravity. The gas producer house and the expanse of the baking building, with its ventilators and movable side windows, are shown in the other

The lower end of the baking building is used as a machining and shipping department. All electrodes are accurately faced and threaded on both ends and special machinery is installed for doing this. In less than carload lots the electrodes are usually shipped in crates.

The gas producer building is also operated largely by gravity. The coal comes in on a railroad switch where it is dumped into a track hopper. From this a conveyor transfers it to a crusher and thence to the upper part of the building into large bunkers. From these the coal is transferred by gravity to a Chapman rotary producer where it is automatically converted into gas. The one producer thus far installed is 10 ft. in diameter and rated to gasify one ton of coal per hour. The large gas mains leading to the baking building are all heat-insulated and 10 ft. in diameter. The one producer easily takes care of the present capacity of the baking and annealing department. The plant is easily capable of expansion, the present building being large enough for two producers.

The pump house, located adjacent to the mixer building, is an important department. It is equipped with two 6000-lb. hydraulic pumps which develop power for the large extrusion presses which form the final electrodes. This department con-

tains also duplicate air compressors and containers together with receiver, piping, etc. The pumps are driven by direct connected electric motors.

An interesting department is that which handles the Niagara Falls current and furnishes power for the calcining and all other departments. Steam is only used for heating purposes and for presses, mixers and gas producers. This is furnished by two boilers which are fired by gas from the producers and with coal when necessary.

The electric power plant is housed in one corner of the calcining building, though it is really a separate section by itself. Duplicate transmission lines pass through the company's property along the fence line so that power from the Niagara Falls Power Co. can be fed either from the Echota substation or from the north end substation. Lightning arrester houses have been placed underneath the transmission lines on the boundary line of the property. To avoid overhead transmission lines on exposed parts of the property and to avoid interference from locomotive cranes, the incoming power lines traverse underground conduits to the power house proper.

As received the power is of 12,000 volt, 3-phase, 25-cycle current, and feeds the substation through duplicate circuits. The power plant contains six transformers of 2500 k.w. total capacity, all the transformers and switching equipment being of Westinghouse make. Because carbon dust is likely to cause motor trouble, the entire motor circuit layout is split up into 10 individual lines, each controlled by its own breaker, affording easy isolation when necessary. The arrangement of the equipment in this department appears to be ideal. In the entire plant there are about 65 motors which were furnished by the General Electric Co.

All the buildings of the plant are of very substantial construction. They are of steel, concrete and brick with gypsum tile for the roofs in most cases. About 1200 tons of structural steel was used. Steel sash for windows are used and the entire construction is fireproof. In the calcining and baking department special provision has been made for ventilation. Not only are there special ventilators in the roof, but there are two rows of swinging or lifting side doors or windows which make the interior comfortable in the hottest weather. The illustrations reveal these ventilating arrangements as well as the general structure of the buildings.

As can be seen from the general plan a feature of the plant is the ease with which expansion of any department can be accomplished in the future. Enlargement of any of the buildings is possible. The railroad facilities are excellent, there being three different switching lines to the three important departments—delivery of raw materials, the gas producers and the shipping department.

The company has a complete chemical and research laboratory filled with modern equipment for the analysis of raw materials and products or the prosecution of research. A new office building with up-to-date lavatories for all employees is in process of erection. Ground was broken for this plant in October, 1918, from designs started in August.

Krakauer, Zork & Moye's Successors, Inc., El Paso, Tex., hardware, machinery and mine supplies, has changed its name to the Krakauer Zork Co. When the interest controlling the company purchased the holdings of the third partner in the firm, in compliance with the Mexican law the word "Successors" was added, as the company has a branch at Chihuahua, Mexico. A recent change in Mexican statutes enables the company to reduce the name to a less clumsy form.

Interstate Commerce Commission Decision in Lake Terminal Railroad Case

The Interstate Commerce Commission has modified its conclusions in the Lake Terminal Railroad case, not only declaring the Lake Terminal Railroad to be a common carrier but also holding that railroad to be and to have been at all times, covered by the cases, a common carrier subject to the act and lawfully entitled to reasonable division of through rates.

It fixes the division at 10c. a ton on all traffic; an increase of 2c. per ton, for the proportion the Lake Terminal has received in the past is 8c. a ton. The commission also awarded reparation to complainant shipping companies, the National Tube Co. and Carnegie Steel Co., from April 1, 1914, to April 14, 1915, during the period that the Trunk Line tariffs covering the Lake Terminal proportion were canceled.

The Lake Terminal Railroad, a subsidiary of the United States Steel Corporation, performs switching service between the various railroads entering Lorain and South Lorain, Ohio, and furnishes terminal facilities to the iron ore docks, blast furnaces, steel works, rolling mills, tube and pipe works of the National Tube Co., the Sheffield Land & Improvement Co., the Lake Shore Electric Railway, the South Lorain Coal & Supply Co. and 36 other shippers where delivery is taken on the four team tracks. It connects with the Baltimore & Ohio Railroad and Pennsylvania Railroad at Lorain, Ohio, and with the New York Central, New York, Chicago & St. Louis and Wheeling & Lake Erie railroads at South Lorain, Ohio.

The principal shipping companies are the National Tube Co. and the Carnegie Steel Co., both also subsidiaries of the United States Steel Corporation, and the award of reparation for the year and fortnight, above referred to, will be to those companies that were compelled to pay the Lake Terminal Railroad charges from April 1, 1914, to April 14, 1915, during the time the tariffs were suspended, and the total amount will be about $200,000, instead of millions that have been erroneously reported elsewhere, and the reparation covers services that were actually performed for the trunk lines at a lower cost than it could have been done by the trunk line railroads themselves.

The importance of this decision is a recognition of terminal railroads of this character by a majority of the members of the commission, regardless of the ownership. The report was written by Commissioner Hall and concurred in by Chairman Aitchison, Clark, McChord, Meyer and Daniels, there being two dissenting, Wooley and Eastman.

Funds Advanced to Aid Machinery Exports

WASHINGTON, Jan. 13.—An advance of $2,000,000 for the financing of the exportation of machinery for the reorganization of the steel mills in France is one of the first steps taken by the War Finance Corporation to make use of the one-billion-dollar fund authorized by the Victory Loan act. So far, although the Victory Loan act was passed nearly a year ago, practically no use has been made of the authority given to aid in financing exports. The details of the transaction involving the French steel mills have not been made public. It is stated that the money is being advanced to one of the export banks, which will furnish funds to that extent to finance these purchases of American machinery. Three other loans have been practically arranged for. One is for $5,000,000 to finance the exportation of locomotives to Poland. The second is for an equal amount to assist in the exportation of agricultural machinery to England, France and Belgium. The third is also for $5,000,000 and involves the foreign purchase of electrical machinery.

It is expected that a considerable number of other loans will be made in the near future. Exporters have been slow in taking advantage of this fund because of the restrictions surrounding it. Such loans as are made will probably for the most part be handled through corporations already formed under State laws for the financing of foreign trade or through such corporations as may be organized under the Edge bill which was recently signed by the President.

Foundry Reduces Unit Cost of Manufacture

Piece-Work System and Improvements in Material Handling Methods and Moldings Practice Increase Output Per Employee

BY GILBERT L. LACHER

A REDUCTION of 30 per cent per ton in the cost of handling material and 15 per cent per ton in the cost of molding constitutes the record achieved in three years by the foundry of the Homer Furnace Co., manufacturer of pipeless hot-air furnaces, Homer, Mich. In doing this the company has made no reduction in wages, but, on the contrary, has been able to keep the compensation of its employees well above the average of the industry. Its molders, for example, receive an average wage which is over 30 per cent above the union scale. As union wages are held up by organized labor as standards of fair pay, the reader may inquire as to the necessity for more generous compensation. The answer of the Homer company, as expressed by H. D. Keller, advisory superintendent, is that it is interested in reducing the unit cost of manufacture and is not concerned if the achievement of that end carries with it increased wages per employee. In fact, the company is only too glad to be able to pay its men liberally.

Pay on Piece-Work Basis

Believing that output, and not time, is the true measure of work, the Homer management has applied a piece-rate plan to all possible operations, including unloading cars, charging the cupola, melting, molding, assembling the furnaces, plating registers and packing. In brief, all productive employees are on piece work, only the maintenance men, such as carpenters and machinists, being paid by the hour because the nature of their work does not permit the application of the piece-rate system.

One of the stock objections of organized labor to piece rates is that when the aggregate wage of the individual workman mounts high because of increased production, the rates are reduced. Such practice is regarded by the Homer company as fatal to the success of a piece-work plan. It therefore adheres strictly to the policy of never reducing a piece scale once it has been set. All rates are determined on the basis of what the management considers a fair day's work, as calculated from its practical knowledge of the operations concerned, and what it regards as adequate compensation commensurate with the current trend of prices and American standards of living.

That these guiding principles are sound has been demonstrated by the fact that no demands have been made on the Homer company during the period of rising prices and wages through which this country has been passing since the inception of the war. The occasion for such action has never arisen because the management has been careful to raise rates whenever economic conditions indicated that advances should be made to reimburse their men amply and to preserve the incentive for production. Considering the steady decline in the purchasing power of the dollar and the concomitant increases in wage and material costs, the reduction in unit cost of manufacture achieved by the Homer plant becomes even more impressive.

Steady Work Rewarded

The management is not only a proponent of compensation according to output, but believes in rewarding its men for regularity in attendance. While it realizes that the men are privileged to lay off if they choose, and indeed at times are justified in doing so, it holds that a full force is essential to efficient operation, and that those employees who report regularly should be appropriately compensated. Accordingly, it pays a premium of 5 per cent of the aggregate pay per week to each man who has put in a full amount of work for six consecutive days. An additional 5 per cent is paid if an employee works four weeks without losing time.

To facilitate the practical operation of the piece-work plan the Homer company has reduced the number of castings required in its products to a minimum. Likewise, it manufactures only three sizes of furnaces, on the theory that greater variety is incompatible with low unit cost of production. Each workman is assigned one special operation or group of operations so that he can become as proficient as possible in his work.

Specialization in Labor

A high degree of specialization in labor is often attacked on the grounds that the monotony of repetition makes work distasteful to operatives, with the result that in the end they are less efficient than if they performed a variety of tasks. This criticism does not seem to be sustained by the experience of the Homer plant. Employees have actually objected to being transferred to new work despite the fact that the change would have meant no loss in compensation. The men prefer to study their given tasks to find new ways of perfecting their skill. The extent to which they have succeeded may be indicated by citing one casting as an example, the case of a 24-in. furnace radiator. It was formerly considered a big day's work to mold and pour four of these radiators. Now one man turns out seven.

In some operations which require more than one employee, such as melting, earnings are based entirely on the tonnage handled. This means that when production is increased the men do not ask for additional help, but try to take care of the added work themselves.

In general, the company follows the policy of having from two to four men working together on like tasks. It is contended by labor unionists that this plan is conducive to pace-making, a practice which often results in over-exertion, to the injury of the workman's health. This danger may exist in some industries, but in the Homer foundry more rapid work merely results in shortening hours. Whereas the union molder generally has a 9-hr. day and is inclined to soldier through his working period in order to appear busy, even when he isn't, the Homer molder has no incentive to follow such a course, as he is at liberty to leave the foundry when he has finished his work. As a result, the men are often through with pouring and the incidental subsequent tasks in less than 8 hr. The advantage in working time is therefore with these piece workers rather than with the union molders.

It might be presumed that the Homer employees would object to working with green help on the grounds that their speed would be diminished. To

overcome this obstacle to the training of new men, the company gives the experienced employee the benefit of all the work done by the learner during the first week and credits him with a gradually diminishing share of the novice's output for each succeeding week until the period of apprenticeship is completed. During the time of training, therefore, the company must bear the expense of a portion of the learner's wages; in the case of the first week, his entire pay.

No Labor Shortage Problem

The Homer company has no labor shortage problem to contend with. Men flock to the plant because they know good wages are paid and that the only limit on a man's wage increases is his ability to produce. A number of molders from other shops in neighboring towns have come to the Homer plant because of the higher earnings under the piece-rate plan. Considering the fact that all molders earn over $8 a day, and a number of them in excess of $100 a week, it is not surprising that jobs in the Homer foundry are much in demand.

One hundred dollars a week for labor is apt to strike one as excessive, particularly in comparison with the salaries of professional men, large numbers of whom earn considerably less. The Homer management, however, is not concerned about the relative merits of molding and other vocations in the social scheme and their proper rewards from the viewpoint of training and value to the community. Its problem is a practical one; namely, to manufacture at a minimum of cost. The highest-paid employee is from its standpoint the most valuable, because he produces the most. The efforts of the employees to increase output, however, are not permitted to reach the point where the quality of the product is affected. The employee is paid only for work which passes inspection.

At times workmen have been coaxed away from the Homer plant, but most of them return and ask for their old positions. The company has built a larger plant at Coldwater, Mich., into which it will move in January. A large number of the foundry employees have already purchased homes in the new location. This is eloquent testimony to the stability and loyalty of the men.

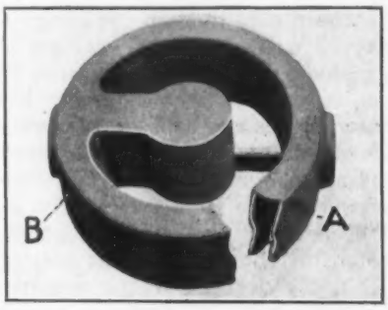
The Training of Foremen

One of the disadvantages of the piece-rate plan is that it develops specialists and does not give the employees the general experience required for supervisory work. The Homer company proposes to remedy this defect by taking those employees who show the most mental aptitude and ambition and putting them through a course of training in all the operations of the foundry. In the evening it will give the men instruction in the technical side of foundry practice, with special attention to problems arising in its own plant. For instance, if a casting is lost, an analysis will be made of the reasons therefor, and in these studies the men will be encouraged to offer their own explanations in open discussion. No employee will be given this course of instruction unless he also take a correspondence course in the fundamentals of foundry practice, such as McLain's system.

Labor-Saving Methods and Devices

The Homer company has not only studied the problem of wages as related to output, but has also directed its attention to material handling methods, departmental arrangement and improvements in molding and pouring practice. Starting with the raw material, the pig iron is moved on a system of narrow-gage tracks to a concrete platform which is on a level with the foundry floor, 18 in. above the iron storage yard. On this platform pig-iron charges are piled on Truscon steel trays, the latter having rectangular flat surfaces with the steel pressed down on the long sides to form supports, the ends being open. These loaded trays are lifted by a set of grab hooks suspended from an air hoist attached to an overhead I-beam and are lowered upon Matthew pneumatic trucks. Through the application of a lever the truck raises the tray sufficiently to permit the free movement of its wheels. This arrangement results in a saving in trucks, as the only limit on the number of charges which can be made up in advance is the number of trays available.

After a tray has been placed on a truck the iron is passed over a scale where the balancing of the charge is taken care of. The truck is then taken up an electric elevator and placed at a convenient point on the charging scaffold. Coke is moved in a similar way, with the exception that it cannot be loaded on trays but has to be handled in the usual coke trucks with three sides to hold the charge. Both the iron and coke are charged directly from the trucks into the charging door. The ordinary method of handling material is to bring it to the charging floor and unload it there. Subsequently the iron and coke are reloaded on trucks, passed over scales and charged into the cupola. It will be noted that the Homer method eliminates two handlings, i. e. unloading and reloading on the charging scaffold.



Gates Enter the Mold at Points A and B, Thus to Eliminate Cleavage Lines

How Errors in Charging Are Prevented

A common scheme of keeping track of charges is to put a mark on a slate each time the cupola is fed. It often happens, however, that the operative forgets to make a mark, or thinking he has forgotten makes one mark too many, with the result that the cupola produces too little or too much iron. The Homer company does not depend on the memory of the charger. Its practice is to arrange the proper number of charges on trucks before the charging door so that there is no chance for a mistake. Obviously, when all the trucks are empty, charging is completed.

The foundry floor contains 68 separate molding departments, as well as a core room and core ovens. Each molding department produces a single size of casting and is served by an air hoist suspended from an I-beam which is connected with I-beams extending through the entire length of the foundry. The air-hoist equipment relieves the molders of all heavy lifting and facilitates the rapid handling of ladles and castings.

Light sections are cast in the portion of the molding floor near the cupola. Heavy castings, which do not require such hot iron, are poured further away from the cupola in the part of the floor adjacent to the cleaning room. This arrangement has the further advantage of reducing to a minimum the distance the heavy castings are moved from the molding floor to the cleaning department.

The various departments of the plant are so

arranged that work moves in a continuous route from the molding floor, through the cleaning room, the mounting room and the crating room, to the shipping platform. In the mounting room the furnaces are assembled on Truscon trays which are moved to the crating room by means of Matthew pneumatic trucks. The floor elevations of the different departments from the molding floor to the shipping platform are progressively graded upward so that the latter is 4 ft. above the railroad siding and the former only 18 in. This difference is also accounted for in part by the depression of the track 18 in. adjacent to the shipping platform.

Labor-Saving Molding Methods

The Homer company has made a careful study of its castings to simplify the molding operations of its men. For example, furnace radiators were formerly poured through five gates, three on the outside of the mold and two on the inside. The same radiators are now poured through only two gates, both of which feed from the outside of the mold. This innovation not only simplifies the work of the molders, but eliminates the necessity of grinding off three gates. Referring to the illustration, the gates enter the mold at points *A* and *B* on the exterior of the section to be cast, just below the top surface. The iron discharged through the gates therefore forms the exterior of the casting first, following which it rises, forms the top and then the interior. When this plan is followed, no line of cleavage forms between any of the different parts of the casting.

The Homer company is about to install a number of molding machines, but thus far has not found that much of its work can be done more advantageously by mechanical methods. It does not condemn molding machines; in fact, it recognizes the great saving they accomplish in some kinds of operations, but does not believe them adapted to extensive use in the manufacture of its own products.

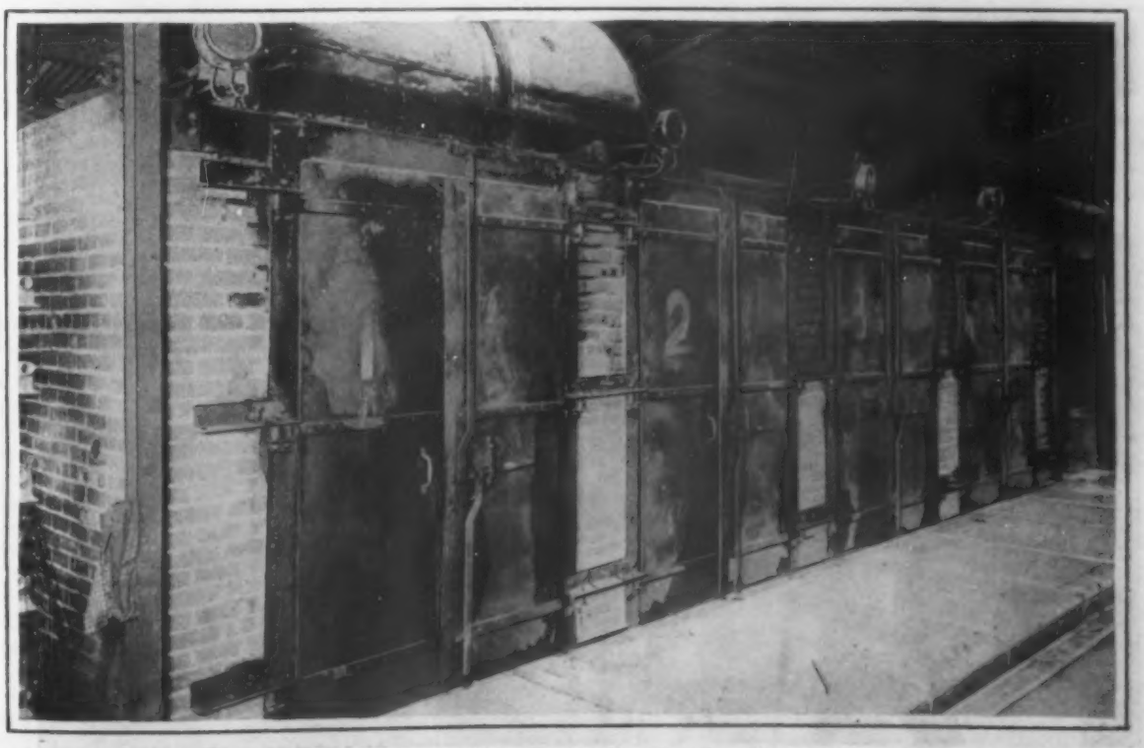
The foundry of the Homer Furnace Co., at Homer, Mich., was constructed three years ago. Its production during the first year aggregated 2200 furnaces. The application of the piece-rate system and labor-saving methods, as well as increased manufacturing facilities, raised the annual output to 5800 furnaces in the second year and 8500 in the third year. Because of the need of larger quarters the company is removing to a new foundry which is now being completed at Coldwater, Mich.

Tests Conducted of Electrically Heated Core Ovens

Ovens Formerly Gas Fired Now Use General Electric Heaters —Current Used and Weight of Cores Baked per Kilowatt

THE Muncie Foundry & Machine Co., Muncie, Ind., recently adopted the use of electricity for heating its core ovens, and a series of tests have been made to show the amount of current consumed in operating the ovens, and pounds of cores baked per kilowatt. Very few electrically heated core ovens have so far been installed, and the results of these tests, therefore, are of particular interest.

The core ovens used were formerly gas-fired and of ordinary fire-brick construction, additional insulation being provided when electricity was substituted for gas. There are four ovens in the battery, 5 ft. wide, 10 ft. deep and 7 ft. high, and the walls are about 14 in. thick. The inside of the ovens is covered with a layer of asbestos brick. The heating units of each oven consist of four General Electric heaters located beneath the floor, and four wall type heaters mounted on the side walls. The doors are of steel, lined with asbestos brick, and radiate very little heat. A 6-in. pipe was used at first for ventilation, but this was reduced to a hole 1 in. in diameter, resulting in a reduction of the amount of heat wasted and a saving in current. The ovens are provided with thermostatic control, and each has a switchboard which is rated at 86 kw., 220 volts,



These Core Ovens, Originally Gas Fired, Are Now Electrically Heated. They are of ordinary fire-brick construction, with a layer of asbestos brick on the inside of the ovens

60 cycles. The cores are baked on cars with racks of a standard type 4 ft. wide, 9 ft. long and 6 ft. high.

Oven No. 1

Time Enter Oven.	Time Switch Was Thrown	Time Withdrawn from Oven	Baking Period Hr.	Baking Period Min.	Actual Kw. Used	Weight of Cores Lb.	Number of Cores	Green Cores Baked per Kilowatt Lb.
8:40	1:45	1:45	5	5	208	2786	41	13.4
8:50	2:05	2:05	4	15	224	2635	43	11.8
8:35	1:45	1:45	5	10	220	2379	41	10.8
1:55	6:15	6:15	4	20	180	2134	45	11.8
8:45	1:35	1:35	4	50	208	2044	39	9.8
9:05	1:30	1:50	4	45	208	2431	43	11.7
8:40	1:30	1:30	4	50	212	2346	38	11.0
Average, large cores baked, 11.4 lb. per kw.								
9:55	1:30	1:30	3	35	120	1476	350	12.3
1:33	5:20	5:20	3	47	120	1914	442	15.8
1:15	4:00	4:00	2	45	168	2389	659	14.2
2:00	5:05	5:05	3	5	116	1899	719	16.4
1:45	5:00	5:10	3	25	124	1781	551	14.3

Average, small cores baked, 14.6 lb. per kw.
Total average, green cores baked, 13 lb. per kw.

Oven No. 2

Time Enter Oven.	Time Switch Was Thrown	Time Withdrawn from Oven	Baking Period Hr.	Baking Period Min.	Actual Kw. Used	Weight of Cores Lb.	Number of Cores	Green Cores Baked, per Kilowatt Lb.
8:52	1:45	2:12	5	20	160	2475	43	15.4
9:50	3:25	3:25	5	35	220	2223	34	10.1
9:20	1:15	3:45	6	25	228	2236	43	9.8
Average large cores baked, 11.4 lb. per kw.								
9:55	1:40	1:40	3	45	160	1753	345	10.9
1:45	4:25	5:05	3	20	140	1347	364	9.7
9:35	2:42	2:42	5	7	176	1876	355	10.6
1:45	5:15	5:15	3	30	144	1774	396	12.3
9:30	1:10	1:10	3	40	144	1208	262	8.4
1:15	4:55	4:55	3	40	148	1880	632	12.7
10:50	2:25	2:25	3	35	164	1647	333	10.0
11:40	2:50	2:50	3	10	160	1302	359	8.2
10:00	1:30	1:50	3	50	168	1611	308	9.6
1:55	5:00	5:00	3	5	180	2417	439	13.4

Average, small cores baked, 10.58 lb. per kw.
Total average, green cores baked, 10.8 lb. per kw.

The foundry is engaged in the manufacture of gray-iron motor car castings, and the cores are of several types, varying in weight and size. In tabulating the results of the tests those not weighing over 15 lb. are classed as small cores and over that weight as large cores. The large cores baked during the tests ranged in weight from 27 to 28 lb., but of the 24 different cores baked only five weighed less than 25 lb. and five over 100 lb. Only six of the 20 small cores baked during the tests weighed over 6 lb. each.

In making each test a record was kept of the baking period, kilowatts used, number and weight of cores, and pounds baked per kilowatt. During the tests in the four

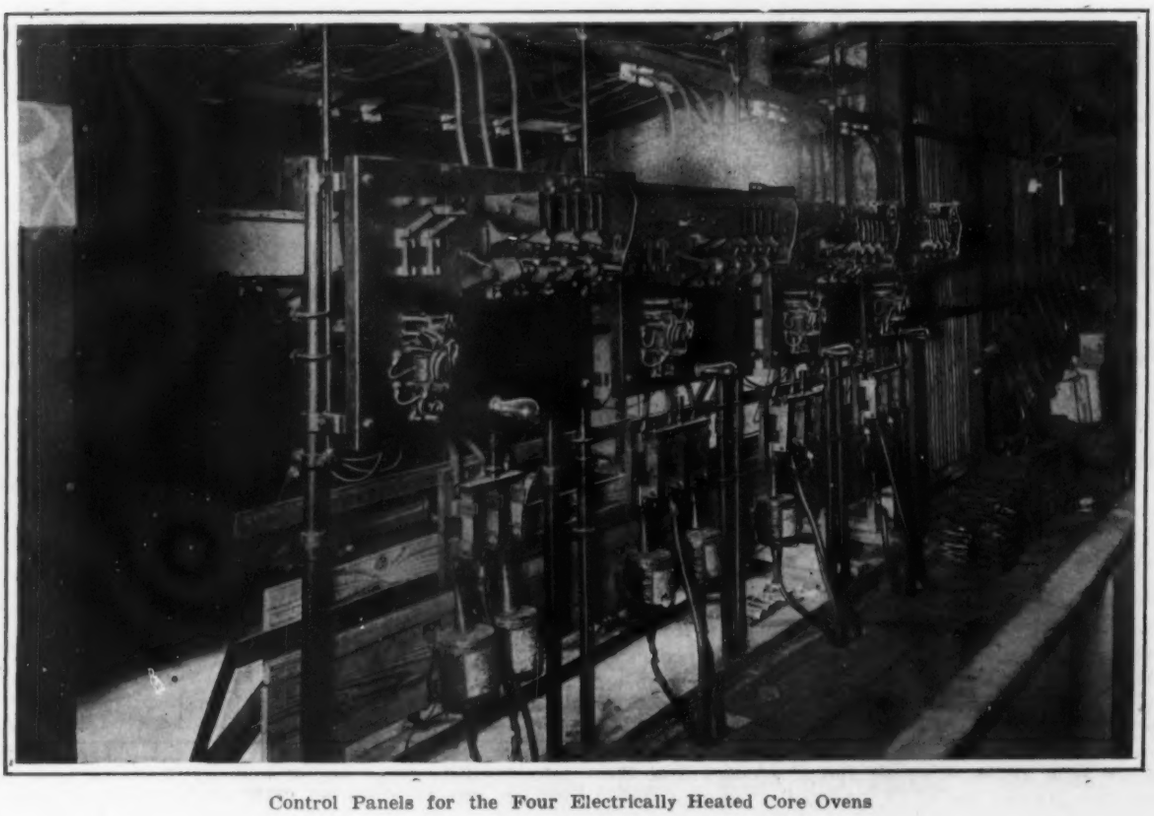
Oven No. 3

Time Enter Oven.	Time Switch Was Thrown	Time Withdrawn from Oven	Baking Period Hr.	Baking Period Min.	Actual Kw. Used	Weight of Cores Lb.	Number of Cores	Green Cores Baked, per Kilowatt Lb.
8:30	1:30	1:30	5	..	236	2858	41	12.1
8:30	1:50	1:50	5	20	216	2680	45	12.4
9:50	3:35	3:35	5	45	212	2687	39	12.7
8:35	1:15	4:00	7	25	236	2285	43	9.7
8:20	1:30	1:30	5	10	212	2251	40	10.6
8:30	1:15	1:30	5	0	212	2076	38	9.8
9:05	1:30	1:40	4	35	208	2776	45	13.3
8:20	1:15	1:30	5	10	192	2272	37	11.8
Average, large cores baked, 11.55 lb. per kw.								
2:02	5:20	5:20	3	18	168	1698	292	10.5
1:35	5:00	5:00	3	25	136	2163	397	15.9
1:40	4:50	4:50	3	10	148	2297	463	15.5
2:00	5:10	5:30	3	30	128	2147	701	16.7
1:45	5:00	5:20	3	35	136	2408	303	17.6

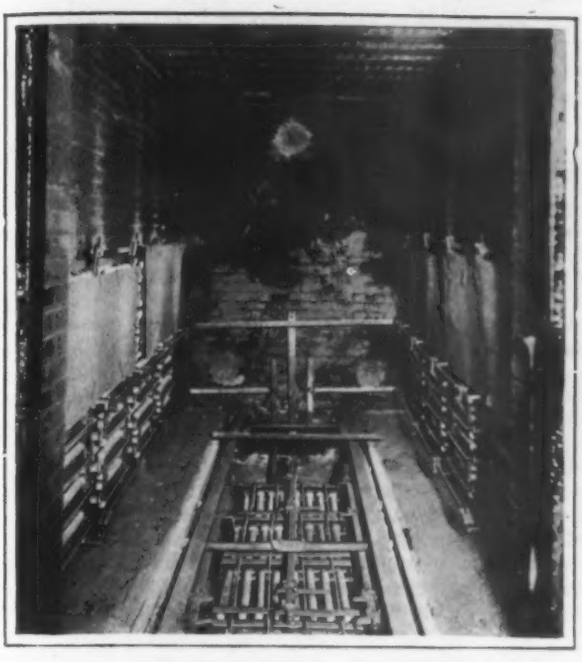
Average, small cores baked, 13.56 lb. per kw.
Total average, green cores baked, 12.54 lb. per kw.

ovens 108,730 lb. of cores were baked, requiring 9389 kw., making the average of 11.6 lb. of cores baked per kw. The records of the ovens are shown in the accompanying tables.

The larger cores required a longer period and more kilowatts for baking than the smaller ones. Most of the small cores were baked in ovens Nos. 1 and 3, which apparently accounts for the better showing of these two ovens. It is stated that the data shows that some of the cores were baked longer than was necessary, and that if some definite time were set for baking cores of



Control Panels for the Four Electrically Heated Core Ovens



Each Oven Has Four General Electric Heaters Beneath the Floor and Four Side Wall Heaters

approximately a certain weight the ovens could be operated more economically and at a higher efficiency.

While the economy of electrical heating depends upon the cost of the electricity, the use of electricity for heating core ovens has certain advantages, including its instant availability, perfect control, which is likely to result in a better quality of cores and the absence of smoke, gases, etc.

Oven No. 4

Time Enter Oven.	Time Switch Was Thrown	Time Withdrawn from Oven	Baking Period Hr.	Baking Period Min.	Actual Kw. Used	Weight of Cores Lb.	Number of Cores	Green Cores Baked, per Kilowatt Lb.
8:10	2:05	2:05	5	55	224	2502	41	11.1
8:10	1:30	1:30	5	20	248	2542	45	10.2
9:55	3:05	3:05	5	10	224	2403	34	10.7
7:50	1:15	3:10	7	20	256	3006	37	11.7
8:05	1:20	1:20	5	15	236	2389	39	10.1
1:25	6:05	6:05	4	40	188	2158	34	11.5
8:15	1:10	1:15	5	0	240	2486	46	10.3
8:15	1:30	1:30	5	15	224	2337	36	10.4
1:45	5:50	6:20	4	35	176	1957	37	11.1
8:10	1:15	1:15	5	5	216	2114	41	9.8
1:45	6:00	6:00	4	15	216	2241	38	10.4
Average, large cores baked, 10.67 lb. per kw.								
1:40	4:40	4:40	3	..	156	2034	405	13.0

Youngstown Sheet & Tube Co.'s New Calendar

The 1920 calendar of the Youngstown Sheet & Tube Co., issued under direction of R. J. Kaylor, publicity manager, has been mailed to customers and friends of the company. It contains highly colored views of the corporation's ore mines, various processes in the making of iron and steel and dwellings for employees. Each calendar is accompanied by a letter, signed by W. E. Manning, vice-president and general sales manager, containing this paragraph: "The industrial and commercial skies will brighten with the growth of understanding that real peace and prosperity can come only through productive effort on the part of each individual in his chosen field of labor."

Among the views are a train of 25 cars loaded with "Youngstown" pipe, leaving the works, with the ores from which it is made in the background; blast furnace blowing engine; Albany mine in the Lake Superior region, ore being removed by stripping; group houses for foreign employees; one of 11 tube mills, forming skelp, welding large sizes of pipe, passing pipe through sizing rolls; athletic field in Campbell Park, created by the company for its workers; houses for the better class of employees; panoramic view of conduit department, rod and wire mills and merchant bar mills, the latter being 1592 ft. in length; Bessemer converting mill and trains of ingots on their way to open hearth furnaces; merchant bar mill, showing course of steel from furnaces through rolls in the process of manufacturing bars, shapes and angles; buttweld tube mills, showing how heated skelp is drawn from the furnace through a bell-shaped die, which forms and welds it into pipe; process of rolling sheets.

Price Trend Still Upward

WASHINGTON, Jan. 13.—The tendency toward higher prices is noted in several recent Government reports, notwithstanding the claims of the Department of Justice that advances have been checked. The monthly review of business and financial conditions of the Federal Reserve Board reports "high and rising prices throughout the country, and full employment of labor at unprecedented wages." This report says that general anxiety concerning the continued advance in prices is exhibited.

"The high costs of production now prevailing are proving a serious problem to steel producers, and one large manufacturer in the Philadelphia district has closed his order books until definite costs can be ascertained," says the review. "Raw materials are advancing, while fuel and transportation charges show possibilities of following in the same direction. Meanwhile the demand for steel is strong in all lines, various railroads placing tonnages for 1920 delivery."

That the end of advancing prices is not yet in sight is asserted by Royal Meeker, United States Commissioner of Labor Statistics.

"I see no prospect of any considerable fall in prices for several years to come," says Mr. Meeker. "It will be impossible for the governments of the world to pay their debts very rapidly. On the contrary, there is every reason to anticipate that credits must be issued to foreign governments, foreign manufacturers and foreign business men in order to rehabilitate the broken and shattered industries of Europe. This being the case, it may be expected that larger volumes of checks and credit instruments will be thrown into circulation, thus boosting prices still higher.

Machine Tools for Colleges

WASHINGTON, Jan. 13.—A considerable number of educational institutions have replied to the questionnaire sent out by the director of sales of the War Department relative to their desire to obtain surplus machine tools under the authorization given in the Caldwell bill passed by Congress. Under this bill recognized colleges and technical schools can obtain machine tools at 15 per cent of the original cost.

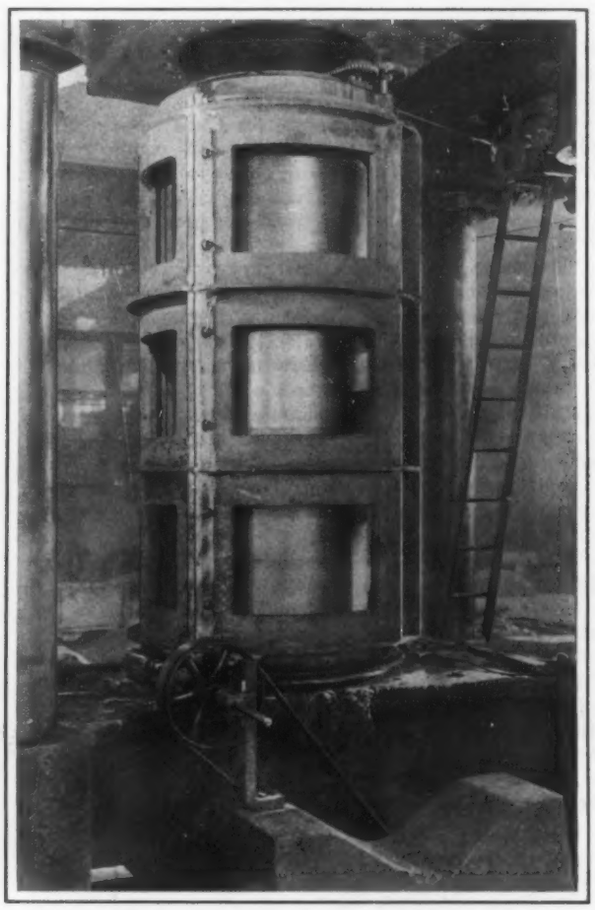
Ohio and Michigan are in the lead, thus far, among States from which answers to questionnaires have been received. This means that the schools of these States will be in a position to obtain first choice of the stock to be allocated. Coupons entitling the institutions to the used machine tools will be issued in sequence of the filing of the answers to the questionnaires. Schools slower to fulfill the requirements of the War Department as a result will obtain their orders from the stock left by those taking first advantage of the offer.

Survey for Detroit Bridge

DETROIT, Jan. 13.—Charles Evan Fowler, of New York City, associate of Gustave Lindenthal, the eminent bridge engineer, is now in Detroit and has started on the work of making a Detroit-Windsor, Ont., traffic survey in behalf of the backers of the Detroit River suspension bridge, announced some time ago. Mr. Fowler has been assigned office space at the Detroit Board of Commerce, and will make his home in the city, as it is expected that the survey will consume at least six months. It is believed that construction of the bridge, once it is started, will take about four years.

Unique Method of Machining Large Hydraulic Ram

The forge shop of the Allis-Chalmers Mfg. Co., West Allis, Wis., is equipped with a 3000-ton hydraulic press of the steam intensifier type. After about nine years of service, the main hydraulic ram of this machine was deeply scored and in bad condition generally. As the ram and crosshead are a one-piece steel casting, removal for machining purposes was impossible without taking the press apart. Disassembling, however, would have involved much delay, as the shop had no crane high enough to handle the entableture which weighs approximately 100 tons. Consequently, Henry



Rig Used for Turning Ram of 3000-Ton Hydraulic Press at Forge Shop of Allis-Chalmers Mfg. Co., West Allis, Wis.

Freeman, superintendent of the shop, called upon G. Luck, the company's special tool designer, for assistance. To Mr. Luck THE IRON AGE is indebted for a description of the rig which he devised to machine the ram in place.

The ram of the press is 9 ft. x 39 in., and was lowered from the cylinder so that collars could be fitted on for a bearing, both at the top and the bottom. The bottom ring acts as a guide and runway, on which a worm gear is fastened. The upper collar acts as a guide only. The worm gear on the bottom ring, as shown in the accompanying illustration, engages a worm drive. A housing, which of necessity was made in halves, is attached to the upper and lower collars. Inside one of these half housings is a slide for a tool head which is operated by a feed screw. At the upper end are shown the proper gears for feeding. A small chain gear, not visible in the illustration, is secured in the center of the top of the ram, transmitting by chain to the gears the necessary feed required when the housing is set in operation. Motive power is applied by the worm drive, shown at the bottom, a motor being attached to the belt which extends below the crosshead.

To secure a straight job, the lower part of the housing was bored large, about ⅛ in., where it is bolted to the worm gear. This allowance permitted adjustment of the housing with bolts and screws to perfect alignment with the ram. One roughing cut and one finishing cut were taken, and with a little draw filing and smoothing off with emery cloth, the work was done.

Plant Officials to Study Foremanship

The Simplex Wire & Cable Co., Boston, has inaugurated a plan of training for its foremen and other executives. It has laid out a program intended to increase production and a more efficient factory organization. A group of 35 men have been enrolled in a course which covers team-work, handling men, organization, machinery and materials, production records, and management. This group includes the president, treasurer, and the factory manager. The course will comprise the systematic study of textbooks and the solution of typical factory problems relating to the texts. Meetings of the men enrolled in the class will be held in the plant every two weeks for three months, and there will be a short lecture delivered at each meeting. The foremen themselves elected to have this training installed and they plan to make it the leading feature of their meetings this fall. The training is under the supervision of the Business Training Corporation, New York, and the lectures will be given by the staff of that company.

Lift Trucks Equipped as Trailers

Lift trucks so equipped that they may be used as trailers are being marketed by the Barrett Cravens Co., 170 North Ann Street, Chicago. They are built in all models in which the company's lift-trucks are supplied and are made of 2000, 3000 and 5000-lb. capacity and with carrying frames ranging from 17⅝ in. to 27 in. in width and from 30 in. to 72 in. in length. When in use as a trailer the handle of each truck remains erect, automatically locked into an upright position. When it has arrived at its destination the handle can be released and the truck drawn away as an ordinary truck. It is explained that the company's lift-trucks now in service can be equipped with the trailer mechanism.

Ingot Mold With Removable Side

An ingot mold with a removable side has been invented (U. S. 1,313,259—Aug. 19, 1919) by Ray G. Coates, Pasadena, Cal., and assigned to the Valley Mold & Iron Corporation, Sharpsville, Pa. One of the objects is an ingot mold provided with removable portions and so constructed that the parts may be standardized in such a manner that corresponding parts of different molds are interchangeable so as to result in economy in manufacture and labor. The removable sides are on hinges and the sides themselves are without draft so that the ingot is not a tapered one, resulting in an ingot more readily rolled or forged.

Silver Wire with Platinum Core

A wire with a platinum core and a silver exterior, known as Wollaston wire, is announced by the H. A. Wilson Co., 97 Chestnut Street, Newark, N. J. The wire is drawn to about 0.004 in. diameter of silver and the platinum core is reduced to 0.00006 in. in diameter. It is explained that the silver outside may be dissolved off in acid leaving the platinum core intact. The wire is manufactured in long lengths and with a continuous platinum core. The manufacturer states that wire of this description was made in Germany before the war and exported.

The United States Civil-Service Commission announces the following examinations: Ordnance engineers, at $3,000 to $5,000 a year, to fill vacancies in the ordnance department at large of the War Department; mechanical engineer in experimental work at $10.80 per day to fill a vacancy in the Engineering Experiment Station, Naval Academy, Annapolis, Md. Applicants should apply for form 1312 for ordnance engineer, and form 2118 for mechanical engineer, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board at the nearest custom house.

MESABI IRON CO. FORMED

Will Treat Lean Magnetites of Eastern Mesaba Range in Minnesota

The recent formation of the Mesabi Iron Co. for the purpose of developing and working the low grade iron deposits on the eastern portion of the Mesaba range is of unusual interest in that it is the first step taken in that district if not in the United States, to commercialize iron bearing materials of this kind, and promises to be the most extensive operation in the country of this nature. As early as 1913 the attention of Hayden, Stone & Co., New York, was called to these low grade magnetite deposits, which upon investigation were found to involve problems of mining and metallurgy similar in many essential respects to those pertaining to the "porphyry coppers," with the development and operation of which that firm had been and still is so prominently identified.

Preliminary investigations and negotiations including the acquisition and control of a large and favorably located area covered a period of about two years extending into 1915, in which year a small syndicate was organized by Hayden, Stone & Co. to drill and otherwise develop a portion of the areas that had been acquired and to continue metallurgical investigation upon a more elaborate scale. A concentrating mill of 100 tons daily capacity of raw material was constructed at Duluth. It was completed about the middle of the year 1916 and was operated more or less continuously until the close of 1918 in the production of commercial products on a scale which resulted in the treatment of a great many thousand tons of material from various parts of the East Mesaba deposits, and the production and sale of several thousand tons of high grade iron concentrates and sinter, which proved upon use to be a desirable material in standard blast furnace practice.

The expenditure of the syndicate in carrying out the above amounted to approximately $750,000. The results of this work were so satisfactory and pointed so conclusively to the commercial practicability of the enterprise, that Hayden, Stone & Co. have recently organized a corporation known as the Mesabi Iron Co. to replace the original syndicate as a more adaptable vehicle through which to develop, equip and operate these properties in a larger and more comprehensive way.

The capital stock of the Mesabi Iron Co. now being issued consists of $3,000,000 of 8 per cent cumulative convertible preferred stock, the shares of which are of $100 par value, and 150,000 common shares of no par value. As all of the securities are being issued to the original syndicate members and their associates, no public offering or flotation will be made or is contemplated until such a time as the commercial plant which is now being built is in actual operation in the production and sale of a commercial product.

The new plant which is being built near the mines on a branch of the Duluth & Iron Range Railroad will have an initial capacity for treating some 3,000 to 4,000 tons per day of the low grade magnetite bearing rock. It is not expected that the construction of this plant can be finished until towards the end of 1920, and accordingly its product will not be on the market much if any before the beginning of 1921. This product will be in the form of agglomerated or sintered magnetite concentrate, containing upwards of 60 per cent iron, low in phosphorus and with practically no moisture.

The quantity of raw material controlled by the company, the commercial and competitive value of which has been satisfactorily proven, may be described as practically unlimited, at least from the viewpoint of the succeeding generation.

The investigation, acquisition and development of this property and enterprise has been directed by Daniel C. Jackling who will continue to supervise the company's business and operations as its president. Dwight E. Woodbridge has been associated with the enterprise since its inception and has had much to do with the field work of investigating and acquiring the mining properties. M. G. Swart has had direct charge of the original syndicate's developments and metallurgical investigations and will continue in that capacity with the new company as the manager of its operations. The well known engineers, Horace V. Winchell and Seeley W. Mudd, have been active in the syndicate's affairs and will continue so as directors of the new company.

The directors and executive officers of the Mesabi Iron Co. are as follows: Charles Hayden, chairman of the board; Daniel C. Jackling, president; John D. Ryan, W. E. Corey, Percy A. Rockefeller, C. M. MacNeill, Sherwood Aldrich, W. Hinckle Smith, Alva C. Dinkey, Seeley W. Mudd, Horace V. Winchell, K. R. Babbitt, W. G. Swart, and J. Carson Agnew.

Copper Industry in 1919

The production of copper in the United States in 1919 was markedly smaller than in 1918, according to preliminary figures and estimates collected by B. S. Butler, Geological Survey. At an average price of about 19c. per lb., the output for 1919 had a value of $243,000,000, as against $471,000,000 for 1918.

The figures showing the smelter production from domestic ores represent the actual output of most of the companies for the first 11 months of the year and the estimated output for December. A few companies gave no figures for November, but furnished estimates of the combined output of November and December. The production of blister and Lake copper from domestic ores was 1,278,000,000 lb. in 1919 against 1,908,000,000 lb. in 1918 and 1,224,000,000 lb. in 1913.

The supply of refined copper, electrolytic, Lake, casting and pig, from primary sources, domestic and foreign, for 1919, is estimated at 1,800,000,000 lb. compared with 2,432,000,000 lb. for 1918 and 1,615,000,000 lb. for 1913.

According to the Bureau of Foreign and Domestic Commerce, the imports of copper in all forms for the first 10 months of 1919 amounted to 346,855,000 lb., against 575,800,000 lb. for the 12 months of 1918. The exports of pigs, ingots, bars, plates, sheets, rods, wire and like copper products for the first 11 months of 1919 amounted to 496,350,000 lb.; the exports for the 12 months of 1918 were 744,429,000 lb.

At the beginning of 1919 about 180,000,000 lb. of refined copper was in stock in the United States. Adding this quantity to the refinery output for the year shows that the total available supply of refined copper was about 1,980,000,000 lb. On subtracting from this total the exports for the first 11 months and the estimated exports for the last month, and assuming that there was no change in stocks, it appears that the supply available for domestic consumption in 1919 was considerably less than the 1,661,000,000 lb. available in 1918.

Victory for the Open Shop

The Worcester, Mass., foundries practically have won their fight for the open shop after a long and bitter struggle during which frequent clashes followed attempts of men to enter or leave plants.

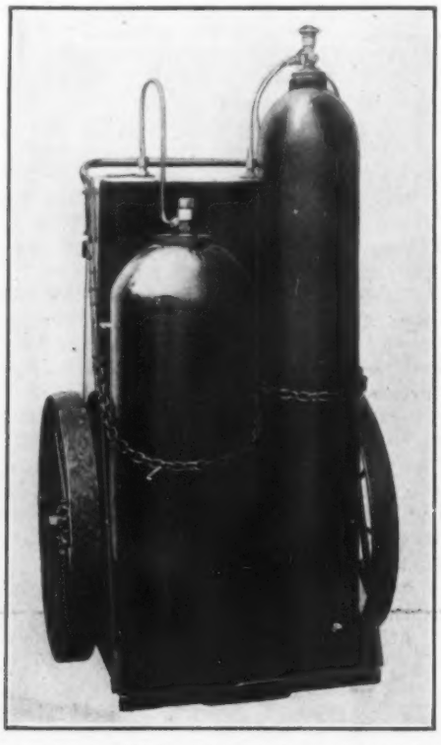
Of the foundries in that city, nine are operating to-day as open shops and three as closed shops. Two of the three closed shops granted all union demands. The other claims to be an open shop, although it is working 60 men, all members of the union. In both classes of shops, the men are working eight hours per day. In the open shops the molders are getting a flat rate of $5.25 per day. In the closed shops the minimum rate of pay is $5.80 per day and the maximum, $6.05, or the same rate as paid by the Boston foundry interests.

The number of men employed in the open shops today ranges from 25 to 80. In one of the closed shops there are 25 men employed, in another 60, and in a third, 150. In both classes of shops the number employed in each individual instance is normal. It is only fair to state, however, that both the open and closed shops could use many more men, as the foundries are simply overloaded with work.

Portable Oxy-Acetylene Outfits

The two-wheel cabinet truck for transporting portable oxy-acetylene and oxy-hydrogen welding and cutting equipment shown in the accompanying illustrations is manufactured by the Davis-Bournonville Co., Jersey City, N. J. It is designed to carry complete operating equipment which may be used direct from the truck.

An upright steel cabinet forms the body of the truck, the bottom base of which projects as a platform to support an oxygen cylinder and an acetylene or hydrogen cylinder. The cylinders are held securely in place by



Complete Welding Equipment Is Provided by This Two-Wheel Steel Cabinet Truck

chains. The cylinder platform is braced to the cabinet body by side straps extending over and above the cabinet to form a ¾-in. round handle bar. Two steel doors in the rear wall of the cabinet are swung on strap hinges riveted to the side walls. The doors lap when closed and a hasp is provided for a padlock.

The cabinet is designed to contain all necessary welding and cutting torches, tips, hose, regulators, gages and accessories. The cabinet and all connections are so designed that when fully equipped the operator has only to open the doors, take down the torch, turn on the gases and adjust them to be ready for work. When in use the cabinet doors are opened toward the operator so that he can see the gages on the regulators. When moving the truck the doors are at the rear.

Spring clasps for four torches are povided within the cabinet, also a small tray for wrenches, a rack with places for 17 tips, and a half-round frame on which the hose may be coiled. Space is provided at the bottom of the cabinet for a supply of welding rods.

Two trucks without the cabinet are also manufactured, one with wheels 31 in. in diameter and a smaller size with wheels 9 in. in diameter.

Crank-Driven Shaping Machines

A 16-in. crank-driven shaping machine has been added to its line by the Hendey Machine Co., Torrington, Conn. This machine is similar in design to the company's 20-in. shaper which was described in THE IRON AGE March 15, 1917, on page 646.

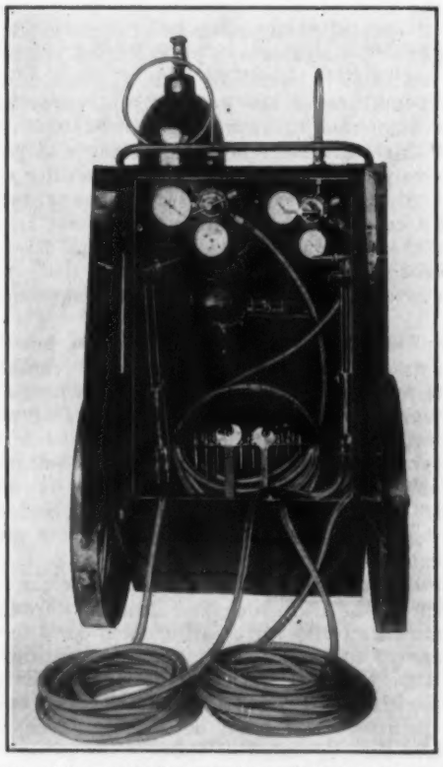
Ways for the ram in the frame have an angle of 50 deg. and the ram has a bearing in the frame of 10 in. x 29 in. The power down feed is set by graduated dial for any feed from 0.005 in. to 0.5 in. in steps of 0.005 in. The table has a horizontal travel of 24 in. and a vertical travel of 15 in. Power cross feed has 35 notches with a range of 0.005 in. to 0.175 in. The minimum distance from the ram to the table is 4 in., the table top is 14 x 16 in., and side of table 13 x 15 in. The tilting top table has an extreme elevation of 25 deg.

New Process for Detinning Scrap

A process for detinning tin plate scrap is covered by a patent (U. S. 1,316,926) granted to Charles P. Tatro and George Delius, Seattle, Wash. It is described as follows: Scrap tin is treated with a strong aqueous solution of caustic soda at 120 to 150 deg. Fahr. in an iron tank which is lined with some material electronegative to tin, such as graphite. The galvanic action set up between the graphite and the tin accelerates the solution of the tin. This operation is repeated until the bath is rich in tin. The tin solution is then transferred to a second iron tank. Bales of scrap tin are suspended in the bath and a current is passed, the tank being the cathode and the tin the anode. In this manner the tin from the bale is dissolved and deposited, while the tin is also deposited from the bath, so that the latter can be returned to the first tank.

Announce New Condenser

A tubular condenser has been developed by S. Morris Lillie and is being manufactured by the Wheeler Condenser & Engineering Co., Carteret, N. J. The tubes are expanded into the right hand tube plate, thus to eliminate leakage at this end. At the other end the tubes are provided with the standard ferrules and condenser packings. The packing is explained as per-



The Cabinet Is Equipped So That the Operator Has Only to Open the Doors, Take Down the Torch, Turn on the Gases and Adjust Them to Be Ready for Work

mitting the tubes to expand freely and yet maintain a substantially leakless joint.

At the left end of the condenser a thin auxiliary tube plate or baffle is provided, through which all of the tubes are passed. The holes in this plate are of such size as to make a sliding fit with the tube. In case of leakage or circulating water through the ferrules and packing, the leakage drops down to the bottom of the compartment between the two tube plates and is then carried off by the drain at the bottom to which is attached either a small direct-acting condensate pump or a vacuum trap, depending upon conditions.

BOILER MAKERS MEET

Cost Account Items Discussed—Comparative Efficiency of Fuel Oil and Stoker-Fired Coal

Systems in use by individual companies in arriving at boiler making costs and the comparative efficiency of fuel oil and coal, stoker-fired, were the principal themes discussed at the first quarterly meeting of the American Boiler Manufacturers' Association held at the Hotel Astor, New York, Jan. 8. The meeting was well attended, about sixty members being present.

Immediately after convening W. C. Connelly, president of the association and of the D. Connelly Boiler Co., Cleveland, presented for discussion the subject of cost systems. A printed tabulation of 31 sets of answers received to a questionnaire that had been mailed to the members was distributed. The list outlined the methods pursued by the various companies in arriving at their boiler-making costs. The discussion proved of considerable interest and continued through the entire morning and a portion of the afternoon session.

Against Compulsory Metric System

Consideration of the use of the metric system for the boiler-making industry resulted in the following resolution adverse to the adoption of the system:

Whereas, there is a widespread or determined effort being made to have the metric system of weights and measures adopted as the only legal one in the United States,

Be it resolved by the American Boiler Manufacturers' Association that the compulsory use of that system is inimical to the interests of the industries of the United States, and be it further resolved that each member of the American Boiler Manufacturers' Association be requested to communicate to his representatives and senators in Congress a strong objection to the forcible imposition of the metric system of weights and measures on the people of the United States.

A chart showing the average monthly sales expressed in per cent of normal sales of water tube boilers of the Babcock & Wilcox Co., New York, was presented and discussed by A. G. Pratt, second vice-president of the company. The chart gave average sales for the years 1907 to 1913 inclusive. In the discussions members were generally in agreement that the sales activities of their companies followed closely the chart shown.

An interesting paper on the use of fuel oil as compared with the burning of coal by means of mechanical stokers was presented by F. H. Daniels, general manager of the Sanford Riley Stoker Co., Worcester, Mass. A chart accompanying the paper showed the prices at which fuel oil can compete with stoker operation, taking into consideration the heating value of the coal and oil as fired, also the overall efficiency of coal and oil burning. The chart is reproduced and the paper is given largely in full elsewhere in this issue.

In addition to the members already mentioned those present included H. N. Covell, Lidgerwood Mfg. Co., Brooklyn; F. G. Cox and J. P. Glenn, Edge Moor Iron Co., Wilmington, Del.; P. Bigelow, Bigelow Co., New Haven, Conn.; E. G. Weni, E. Keeler Co., Williamsport, Pa.; F. H. Figsby, Ernst & Ernst, New York; A. H. Chapman and A. C. Weigel, Walsh & Weidner Boiler Co., Chattanooga, Tenn.; C. Kellogg, Kewanee Boiler Co., Chicago; D. Primrose, Atlantic Coast Shipbuilders' Association, New York; J. V. Loughlin, Dover Boiler Works, Dover, N. Y.; C. F. Koopman, Jr., New England Iron Works Co., Boston; B. R. Barder, Biggs Boiler Works Co., Akron, Ohio; J. S. Hammersbough and O. Brown, Springfield Boiler Co., Springfield, Ill.; C. W. Walz and C. R. Turn, International Boiler Works Co., East Stroudsburg, Pa.; A. D. Schofield, J. S. Schofield's Sons Co., Macon, Ga.; M. H. Broderick, Broderick Co., Muncie, Ind.; E. R. Fish, Heine Safety Boiler Co., St. Louis; W. J. Mohr, John Mohr & Sons, Chicago; B. Scannel, Scannel Boiler Works, Lowell, Mass.; T. F. Schlade and J. C. Gaskell, Ames Iron Works, Oswego, N. Y.; O. M. Teedor, Teedor Boiler Mfg. Co., Cincinnati; F. M. Chipman, International Engineering Works, Framingham, Mass.; G. W. Bach, Union Iron Works, Erie, Pa.; E. C. Fisher, Wickes Boiler Co., Saginaw, Mich.; F. T. Johnston, Johnston Bros., Ferrysburgh, Mich.; W. G. Cameron, Frost Mfg. Co., Galesburg, Ill.; D. Fitzgibbons, Fitzgibbons Boiler Co., Oswego, N. Y.; C. B. Shoemaker, 2nd, Glasgow Iron Co., Philadelphia; G. T. Bliss, Erie City Iron Works, Erie, Pa.; F. H. Samuels, Sanford Riley Stoker Co., Worcester, Mass.

Rail Buying Policy of the U. S. Railroad Administration

WASHINGTON, Jan. 13.—Present indications are that the Railroad Administration will make no more purchases of steel rails, at least not in any considerable quantity, during the remaining weeks of Government control. The Railroad Administration has been in the market for rails for several months, but with the exception of about 40,000 tons ordered from the Bethlehem Steel Co. some weeks ago no recent purchases have been made. The chief reason as stated by the officials of the Railroad Administration is the inability of the steel companies to promise early delivery. It is stated that some additional purchases may be made in case it develops that early deliveries could be assured.

The purchases of rails recently announced by the railroads have been made by the railroad corporations for delivery after the return of the roads to their owners. The Railroad Administration has had no hand in these purchases.

The Railroad Administration also expects to make no further purchases of equipment because no funds are available for that purpose. During the month of November records just compiled show that 173 freight cars, of which 151 were refrigerator cars, were constructed in the railroad shops.

Shipbuilding on the Lakes

The Lake shipyards built 217 vessels during 1919, 188 steamers and 29 tugs, all for the Emergency Fleet Corporation. Although the Lake yards were kept busy the entire season, not a boat was built for the Great Lakes, all being sent to the coast for salt water service. Fifty-seven steamers and 19 tugs ordered for 1919 delivery were not completed, but most of these will be ready to sail in the spring.

The American Shipbuilding Co. built 93 of the steamers completed during the year. The Great Lakes Engineering Works Co. turned out 37, the Toledo Shipbuilding Co. built 12, the Saginaw Shipbuilding Co. 8, the Manitowac Shipbuilding Co. 12, the McDougall-Duluth Shipbuilding Co., of Duluth, 17, and the Globe Shipbuilding Co., of Duluth, 9 steamers.

The American Shipbuilding Co. now has uncompleted orders for 20 boats. The Great Lakes Engineering Works will build for delivery early next season 7, the Toledo Shipbuilding Co. 4, the Manitowac Shipbuilding Co. 7, the Saginaw Shipbuilding Co. 6, the McDougall-Duluth Shipbuilding Co. 8, and the Globe Shipbuilding Co. 5.

Lake shipyards have already received orders for a number of additional orders for boats for salt water service to be built during 1920.

Testing Society to Meet at Asbury Park

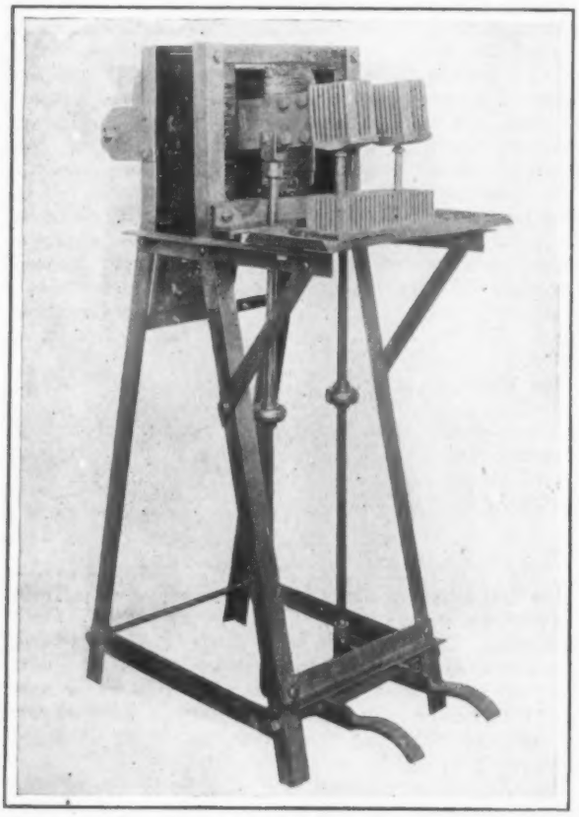
The American Society for Testing Materials will hold the next annual meeting at the New Monterey Hotel, Asbury Park, N. J., in the week of June 21. The executive committee states that it has come to the conclusion that it is to the best interests of the society to make a departure from the precedence of long standing of holding the annual meeting at Atlantic City.

The total number of new members added last year was 401, against 362 in 1915, which was the largest number in a single year in the previous history of the society. The net growth this last year was 249, making the total membership at date 2572.

The Rumbler is the title of an attractive and well-edited house organ sent out monthly by the Reading Steel Casting Co., Reading, Pa.

Electric Rivet Heating Machine

The electric rivet heater shown in the accompanying illustration is a recent product of the General Electric Co., Schenectady, N. Y. A transformer rated at 15-kw. is mounted on angle iron legs, which may be equipped with wheels. At the front of the transformer, two copper bars are fitted with heavy air cooled electrode blocks of cast copper, and under these is another copper block which acts as a support and electrical connection for two rivets in series. When the rivets are stood up on the block and the electrodes are allowed to drop on the head of the rivet, the circuit is completed and heating begins. The two electrodes may be raised independently by two foot pedals, gravity being sufficient to lower the electrodes when the foot is removed. A primary tap switch mounted on the back legs of the machine gives all the variation needed for different lengths and diameters of rivets and rate of heating desired.



Electric Rivet Heater Rated to Heat 500 ½ x 1¼-in. Rivets in One Hour

The sizes so far developed are a 5-kw. two jaw heater for rivets up to ½ in., and a 15-kw. two jaw heater for rivets up to ⅞ in. in diameter. The manufacturer states that in a test conducted with the 15-kw. heater, 500 ½x1¼-in. rivets were heated in one hour.

Carnegie Steel Co. Annual Dinner

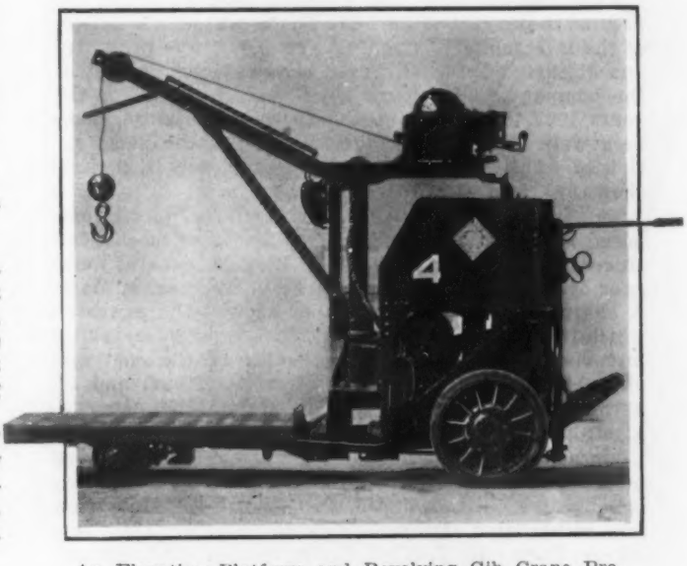
The twenty-third annual dinner given by the operating officials of the Carnegie Steel Co. was held at the William Penn Hotel, Pittsburgh, Saturday evening, Jan. 3, and was attended by more than 100 officials, superintendents and others of the Carnegie organization. Among the guests were James A. Farrell, president of the United States Steel Corporation, who made an extemporaneous address, in which he congratulated all those present on the very high standard of efficiency maintained by the Carnegie Steel Co. organization.

Homer D. Williams, president of the Carnegie Steel Co., was toastmaster, and the first speaker was James R. Mills, Cleveland district sales manager, who talked on "The Salesman." The next speaker was O. J. H. Hartsuff, general manager of the New Castle, Pa., district, who talked on "The Man Outside." He was followed by William O'Neill Sherman, chief surgeon of the Carnegie Steel Co., whose subject was "The Plant Surgeon." The last speaker was John S. Oursler, now general superintendent of the Homestead Steel Works, who talked on "The Man Inside." There were other brief addresses by a few of the guests, and this dinner in every respect was one of the most successful ever given by the operating officials of the Carnegie Steel Co. Letters of regret at being unable to be present were read from Charles M. Schwab, William E. Corey and other former prominent officials of the Carnegie Steel Co., who were unable to be present.

Electric Truck With Revolving Crane

An important development in the design of electric storage battery trucks for industrial plants was the providing of these trucks with elevating platforms, and more recently the equipping of stationary platform trucks with a revolving gib crane. Combining these two features in one type of truck, the Elwell-Parker Electric Co., Cleveland, has brought out a lift platform truck with a revolving crane. The combination provides a truck of unusual flexibility that can be used for general lift truck work, and the crane facilitates the handling of material too heavy to lift by hand, either for placing material on the truck platform or on a false platform to be picked up by the elevating platform of the truck. After loading, the crane also saves hand labor in unloading heavy material. Among uses that the truck is being put to is the loading of farm tractor castings in box cars, the crane lifting the castings from the truck and setting them up on end in the car.

The truck itself is of standard Elwell-Parker design, having a single reduction worm drive, four-wheel steer, two-wheel drive, solid rubber tires, a platform 54 x 26 in., 4000 lb. capacity, a 4½-in. lift and a speed of 400 to 600 ft. per min., there being three speeds in either direction. The crane swings on a ball-bearing column and is counterbalanced by a hoisting mechanism and reversing controller. The crane has a capacity of 1000 lb. at a fixed outreach of 48 in.



An Elevating Platform and Revolving Gib Crane Provide Unusual Flexibility for This Storage Battery Truck

Foundrymen Will Visit Mesta Plant

On Monday evening, Jan. 19, the members of the Pittsburgh Foundrymen's Association will make a visit of inspection to the plant of the Mesta Machine Co. at West Homestead, Pa. The company will provide a special train for its guests, and will serve dinner in its own dining room at the plant. The Mesta Machine Co. has made in the past year some very large additions to its works, and now has some of the largest plants in the country devoted to the manufacture of engines of various types, rolling mill, steel works, tin plate and sheet mill equipment.

TRADE WITH ITALY

Prospects for Exports from the United States Are Not Encouraging

WASHINGTON, Jan. 6.—Because of the high cost of ocean transportation, unsettled exchange conditions and heavy stocks of materials still held by the Italian Government, prospects for the sale of American iron and steel in Italian markets are not bright. The situation is described in a report to the Bureau of Foreign and Domestic Commerce from Commercial Attache Alfred P. Dennis, at Rome.

"The swift transformations wrought by the war have left the Italian steel producers in a most uncomfortable situation," says Mr. Dennis. "The big Ilva company has been obtaining its ores from native sources on the Islands of Elba and Sardinia. The great Lombardy steel and iron plants (Acciaierie e Ferrieri Lombarde) have been collecting scrap iron and steel from all about the Mediterranean basin—Spain, North Africa, southern France. Other big concerns, such as Ansaldo, have been importing plates, shapes and bars as well as pig iron from the United States, France, England or wherever the material could be obtained.

"As the exchange becomes steadily more averse to purchases in dollars, and with the price of coal still ruling above 300 lire ($57.90, normal exchange) per ton, the Italian steelmakers are anxiously turning to former sources of supply. It looks as if German iron and steel will resume their wonted primacy in the Italian markets, but under other names. Austrian steel will henceforth come from Bohemia, and German steel from Lorraine. Bohemia, of all the components of the old Hapsburg monarchy, is most richly endowed with coal and iron. The former German steel works in Lorraine now controlled by the Comptoir Francais are looked to as a fruitful source of supply.

"The war has transformed Europe politically, but it has not altered the location of mineral deposits. In the main, therefore, exchanges will be resumed along the old economic channels. The semi-tropical fruits of southern Italy will seek their former convenient markets in the north, where coal and iron are found in close proximity. These regions, but a few score leagues from the Italian frontiers, will continue to enjoy a favored position in the Italian iron and steel trade. Italians are now in Bohemia securing quotations on iron and steel for exportation to Italy, and negotiations are being made for purchases in Lorraine. French steel rails are quoted for delivery at the Italian border (Modane) at 750 lire (or about $75 at present exchange) per ton. German steel products are quoted for delivery at the Italian border (Chiasso) at 1000 marks, or $38, per ton (mark equals 0.38 lire at present rates). It is understood that these prices may be shaded to meet competition.

"The immediate future seems unpromising for the sale of American iron and steel in Italian markets. The high cost of ocean transportation is a strong repressive factor; although Birmingham, Ala., steel occasionally finds its way here at attractive freight rates in the form of ballast for cotton cargoes destined for Italy. Dollar exchange has risen to more than double par and acts as an automatic brake upon Italian purchases in America; whereas, Italian exchange suffers little in purchases from France and actually commands a heavy premium in Germany and the component states of the old Hapsburg monarch. German and French standards in steel fabrication are also better known and appreciated than American standards in steel shapes. And the heavy stocks of iron and steel material still held by the Italian Government for liquidation tend to unsettle the market and throttle foreign purchases.

"The far future, however, carries a better promise. The inevitable stabilizing of European exchange will put the United States in a more favorable position as a seller of steel and iron. Furthermore, it is reasonable to look for heavy reduction in ocean freight rates. The American exporter who can not meet European competition on a $28 per ton rate might well take heart if the rate should be cut to $15 a ton."

English Plants Hampered by High Costs

WASHINGTON, Jan. 6.—Wartime expansion of manufacturing plants in the Bradford district in England has paved the way for greater export trade, but increased wages, shorter working hours and high cost of materials threaten to hamper it. Consul Augustus E. Ingraham, in an annual review of the situation in this district, describes present conditions.

"The iron and steel works, the electrical engineering trade, motor engineering, textile-machinery making, machine tool trade, wire drawing, and the production of printing machinery, laundry machinery, engine packing, and many other goods, the variety of which is steadily increasing, are all branches of the local engineering industry," says Mr. Ingraham. "The production of munitions during the war was therefore very largely carried on in this district. Practically all the firms were working at top pressure on Government orders.

"The National Shell Factory at Bradford, staffed mostly by women, was one of the largest of its class in the country, producing high explosive shells and fuses. For miles around Bradford, in brass works, motor garages, machine shops attached to mills, etc., component parts of fuses were produced in hundreds of thousands and brought to the Bradford factory for assembly.

"The Phoenix Dynamo Mfg. Co. in Bradford, employing 4000 hands, produced millions of shells, a large quantity of machine tools, also the fastest and biggest seaplanes and flying boats. The National Shell Factory at Keighley was one of the first to start making shells and its production constituted a record.

"In Halifax the machine-tool factories were extended to three times their former size. In that district shells, parts of submarines, aeroplanes, antisubmarine devices, and marine, oil, and steam engines were also produced in large numbers.

"The expansion of the engineering factories and equipment in this district foreshadows an increased activity in production for export, and in addition to their former products many new lines are being developed. But the present high cost of materials, the increased wages, and shorter working hours may have a serious effect on export trade. Textile-machinery makers are preparing for the expected demand for their machines, not only from British firms but also from all foreign markets."

Japan's Ore Supply

WASHINGTON, Jan. 12.—Consul General George H. Scidmore, at Yokohama, has sent to the Department of Commerce a Japanese report stating that by virtue of agreements existing between Japan and the management of Taiyeh and other iron mines in the Yangtze Valley, that country will be able to obtain an abundant supply of iron ore from China for many years. Under these agreements the government plant at Kyushu and other establishments in Japan are to obtain a supply of 360,000 tons this year, and the supply for next year will amount to 600,000 tons.

A British expert is of the opinion that the total output from the Taiyeh iron mine will be 9,000,000 tons, while Japanese experts estimate that the output will be much larger. Mining operations will shortly be started at the Hsiang-pi-shan (the largest in the Yangtze Valley) and other mines, and Japan will obtain a supply of iron ore from thence. It is further reported that Japan has made another agreement with the management of the Shengmen iron mine in the Yangtze Valley for a supply of ore.

Technologic Paper No. 141, Bureau of Standards, entitled "An Electrolytic Resistance Method for Determining Carbon in Steel," describes a method and apparatus for rapidly and accurately determining carbon in steel by absorbing in a solution of barium hydroxide the carbon dioxide resulting from direct combustion of the metal in oxygen, and deducing the carbon content from the change in electrical resistance of the barium hydroxide solution.

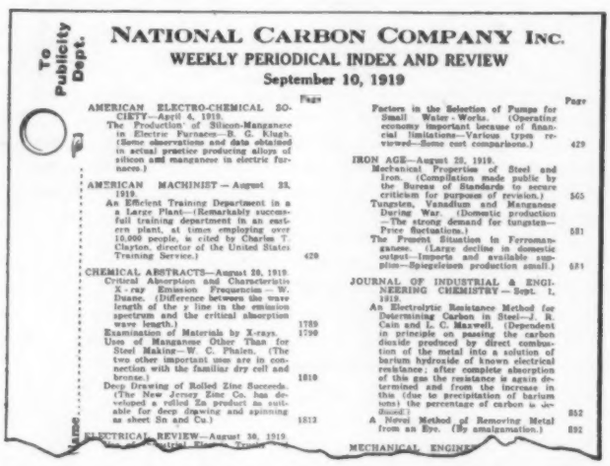
DISTRIBUTING PERIODICALS

Printed Lists of Publications and Pertinent Articles Circulated in Factory

"How can business periodicals be made of maximum usefulness in an organization?" was a question asked recently by a subscriber to THE IRON AGE, and doubtless there are many others who are giving this matter considerable thought, perhaps feeling, as the question might indicate, that the usefulness of trade publications might be increased in their plants by the adoption of some more definite system for the circulation of the publications among members of their organizations.

The National Carbon Co., Inc., Cleveland, has given this subject a great deal of attention, and the methods that it uses for distributing business publications among the men connected with its main plant and ten other factories probably could be successfully applied to other industries, either by companies having only one plant, or those whose activities are distributed among several units located at widely separate points.

The publicity department of the National Carbon Co. is subdivided into two divisions. One of these looks after external publicity, or advertising, and the other has charge of internal publicity work, or of



To Publicity Dept.

NATIONAL CARBON COMPANY INC.
WEEKLY PERIODICAL INDEX AND REVIEW
September 10, 1919

Name ...

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AMERICAN ELECTRO-CHEMICAL SOCIETY—April 4, 1919.
The Production of Silicon-Manganese in Electric Furnaces—R. C. Kluge. (Some observations and data obtained in actual practice producing alloys of silicon and manganese in electric furnaces.)

AMERICAN MACHINIST—August 28, 1919.
An Efficient Training Department in a Large Plant—(Remarkably successful training department in an eastern plant, at times employing over 10,000 people, is cited by Charles T. Clayton, director of the United States Training Service.) 420

CHEMICAL ABSTRACTS—August 20, 1919.
Critical Absorption and Characteristic X-ray Emission Frequencies—W. Duane. (Difference between the wave length of the γ line in the emission spectrum and the critical absorption wave length.) 1789
Examination of Materials by X-rays. 1790
Uses of Manganese Other Than for Steel Making—W. C. Phalen. (The two other important uses are in connection with the familiar dry cell and bronze.) 1810
Deep Drawing of Rolled Zinc Succeeds. (The New Jersey Zinc Co. has developed a rolled Zn product as suitable for deep drawing and spinning as sheet Sn and Cu.) 1813

ELECTRICAL REVIEW—August 30, 1919.

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Factors in the Selection of Pumps for Small Water-Works. (Operating economy important because of financial limitations—Various types reviewed—Short comparisons.) 429

IRON AGE—August 28, 1919.
Mechanical Properties of Steel and Iron. (Compilation made public by the Bureau of Standards to secure criticism for purposes of revision.) 565
Tungsten, Vanadium and Manganese During War. (Domestic production—The strong demand for tungsten—Price fluctuations.) 581
The Present Situation in Ferromanganese. (Large decline in domestic output—Imports and available supplies—Spiegeleisen production small.) 581

JOURNAL OF INDUSTRIAL & ENGINEERING CHEMISTRY—Sept. 1, 1919.
An Electrolytic Resistance Method for Determining Carbon in Steel—J. R. Cain and L. C. Maxwell. (Dependent in principle on passing the carbon dioxide produced by direct combustion of the metal into a solution of barium hydroxide of known electrical resistance; after complete absorption of this gas the resistance is again determined and from the increase in this (due to precipitation of barium ions) the percentage of carbon is deduced.) 852
A Novel Method of Removing Metal from an Eye. (By amalgamation.) 892

MECHANICAL ENGINEER

Sample Sheet, Distributed Weekly to Employees, Which Lists Pertinent Articles from Trade Publications with an Outline of Their Chief Points of Interest.

bringing information outside to members of the organization, and calling their attention to various topics that appear from week to week or month to month, in which they may be interested. The company is a subscriber to approximately 90 publications, including trade and technical papers, and of some of these receives several copies, one copy of some of the most important magazines being provided for every seven or eight employees. This list includes practically all of the American trade papers that might have articles of interest to men in any of the company's departments, and a number of foreign publications. The magazines as they come in are carefully looked over by two or three technical men, either chemists or electrical engineers, who with the advertising personnel and library staff comprise the publicity department. These men pick from the current publications all articles that may be of interest to any department, and a comment is made on each article to bring out its special application to the organization. One of the listed articles may appeal to the laboratory, factory department, sales organization or to some other department, the matters covered including, in addition to technical subjects, such topics as employment, welfare, business organization, etc.

Issues Printed Lists of Pertinent Articles

The articles are then listed under the names of the various publications, together with the date of issue, page, name of author and comment bringing out the chief points of the article that are likely to be of particular interest to men associated with the company. This list, under the title of "Weekly Periodical Index and Review," is printed weekly on a single sheet, about 6 x 9 in., and copies are sent to 800 members of the organization, being sent either to the men individually, or to heads of departments, to be distributed to men under them. The scope of the Index is indicated by a recent issue, probably typical of others, which lists 40 articles that are found in 26 publications. The Index also lists all new books and pamphlets received, and United States and British patents granted that may be of interest to men in any of the departments.

Space is provided on one side of the weekly Index for the recipient to fill in his name and department. He then checks the article that he wishes to receive and returns the sheet to the publicity department. After the library clerk makes the proper records, the publicity department returns the Index to the sender and he may file it in a binder for future reference. Magazines may be kept four days at the Cleveland plant, and ten days at other plants. Other material may be kept a week unless otherwise specified. When there are several requests for a publication containing a certain article, a waiting list is prepared and the magazine called for is sent in rotation to the various applicants. However, an exception is made in favor of men in more important positions, as it is to their interest and that of the company for them to have the important articles without delay. Many publications containing articles that are certain to be of interest to technical men or heads of departments are sent to these without waiting for a formal request.

A separate mailing list is kept of all employees desiring to receive certain magazines regularly, and a person whose name is on the mailing list for a specified publication receives it regularly without checking it on the weekly Index. This mailing list is carefully selected, and includes only those persons who, through the character of the work, are expected to keep in touch with the publications sent. Other employees have to await their turn further down the list. All magazines secured through the regular mailing list may be kept one week except those which have a very large circulation. In this case the magazines may be kept only four days, and are distinguished from the other periodicals by a red label pasted over the front cover. Salesmen on the road are kept advised through the Index of articles of interest to them that appear in current magazines, and if a salesman is unable to buy the magazine, the publicity department will mail a copy on request. Copies of the various magazines are also kept on the reading room table at the main plant, and some of the important periodicals are supplied to the other factories directly by the publishers.

After the weekly Index has been circulated, all articles are filed according to the Dewey system on large manila cards so that if an employee wishes to review an article on a particular subject, he can look this up in the library files. The average circulation of periodicals through the publicity department is 600 copies per week.

The company's library consists of about 4000 books covering technical and business subjects to which additions are constantly being made, these being listed in the weekly Index when received. In the library are also found bound volumes of the leading technical and trade periodicals. A card catalog of these books and pamphlets is maintained. Books, except reference books, are circulated among employees on application the same as magazines.

In addition to its other facilities for distributing information, the company's publicity department has printed in pamphlet form a complete list of all technical publications to be found in the various libraries in Cleveland. In this the periodicals are listed alphabetically and under the name of each publication is noted the library or libraries in which they may be found, as well as the periods covered by the bound magazine files found in the different libraries.

A bonding metal known as Mereti, for repairing cracks, etc., on aluminum, brass, copper and white metal is being marketed by T. P. Walls Tool & Supply Co., Inc., 75 Walker Street, New York.

Fuel Oil Versus Coal on Mechanical Stokers*

An Analysis of Advantages and Disadvantages —Underwriters' Restrictions—Chart for Determining Prices at Which Fuels Compete

BY F. H. DANIELS

ALMOST all comparisons of oil and coal consider the burning of fuel oil as compared with the hand-firing of coal. The purpose of this article is to show the comparison of fuel oil with coal burned on up-to-date mechanical stokers.

The accompanying chart shows what the price of oil of different grades must be in order to compete with coal of various grades at varying prices. If the cost of coal, its B. t. u. heating value, and the overall efficiency at which it is burned are known, the chart shows how to find the price at which oil will compete, considering the different heating values of the oil and the overall efficiency which may be obtained with oil burning. The example worked out on the chart shows $6 coal, 14,000 B.t.u., 70 per cent overall efficiency, as comparable with oil at $1.45 a barrel, 19,000 B.t.u., and used with an overall efficiency of 75 per cent. This chart takes into account only the cost of the two fuels and does not take into consideration operation costs such as labor, maintenance, or the first cost of the plant. It should be noted that the B.t.u. of both the oil and of the coal are based on fuel, as fired. Taking 18,250 B.t.u. for the heating value of the oil and 14,000 B.t.u. for the corresponding heat content of the coal, we would have to burn 4.56 barrels of oil to equal one ton of coal. This is assuming equal overall efficiencies.

The chief advantages claimed for the use of oil as compared with coal are as follows:

1—High efficiency.
2—High capacity.
3—Low labor costs.
4—Low first cost of equipment.
5—No smoke.
6—Quick response to overload demands.
7—Less storage space required than coal.
8—Small amount of refuse.
9—No banking losses.

The disadvantages are the:

1—Fluctuations in price.
2—Uncertainty of supply.
3—Fire risk.

The chief advantages claimed for fuel oil will be taken up one by one.

High Efficiency

Of course, under the best of test conditions, fuel oil has shown overall boiler efficiencies up to 82 per cent and some tests show even above this. But the up-to-date mechanical stoker can show equally good results, and it is fair to assume that under average operating conditions the efficiency of furnaces using fuel oil will be no greater than that obtained with mechanical stokers burning coal of 12,500 B.t.u. and higher. This average efficiency would range from 65 per cent to 75 per cent, depending upon the size of the plant, kind of coal or fuel oil used, the average rating at which the boilers are operated, and the fluctuations in load. Of course, it must be remembered that there is good and poor fuel oil just the same as there is good and poor coal, although the range of heating value of coal is more than the range of heating value of fuel oil.

As regards oil burners, they are much more subject to abuse on account of too much excess air than a stoker burning coal. If you try to give a coal fire too much air it will go out, but you can give an oil burner as much excess air as you please and there is no indication that this bad condition exists. The oil flame burns just as brightly, although you may give it three or four times the air required for best efficiency.

In connection with this question of efficiency, almost all land installations burning oil use high pressure steam atomizers. The steam required amounts to about 2 per cent of the boiler output under ideal conditions, and it may go as high as 5 per cent. The steam required for operating stokers and the forced draft equipment, if such is used, will be less than the corresponding figures for steam used by the oil burners. It should be remembered, however, that the steam used for stoker drive can be recovered by exhausting the prime movers into feed water heaters, while the steam used for oil burners is an absolute loss. If electric drive is used for stokers the amount of steam taken from the boiler output will be much less, because the electric motors then share in the economy of the main prime mover.

Comparative Capacities

The multiple-retort underfeed stoker will show higher boiler capacities than any which can be obtained with fuel oil. Most tests on fuel oil have been in connection with boilers where the furnace volumes were restricted. There have been no tests published where fuel oil has been used in connection with a furnace large enough to really enable the oil burners to show up to best advantage. It is safe to state, however, that with equal furnace volumes mechanical stokers will show higher capacities than are possible with oil.

Labor and Equipment Costs

Under proper conditions the mechanical stoker should not require more than one fireman and one water tender for every 5000 hp. of boilers. It is impossible for a plant equipped with fuel oil to get along with a less number of men. As far as tending to the water level of the boilers is concerned, the labor involved is equal in each case, and the stoker does not require any more adjustment than would be needed for the manipulation of oil burners.

Of course it must be admitted that the use of fuel oil practically eliminates the question of ash handling, but this is not a very serious factor, because the labor required for handling the ashes in an up-to-date plant is not very large and the class of labor is the lowest paid.

On the comparative first cost of the two systems, the use of fuel oil avoids the necessity of the purchase of mechanical stokers and auxiliary equipment, which might range in cost from $8 to $14 per rated boiler hp. The fuel oil also avoids the necessity of coal and ash handling equipment, which would cost about $6 to $8 per rated hp. This would make a total of about $18 per hp. As an offset to these items fuel oil requires storage tanks, oil pumps and heaters, which will cost anywhere from $10 to $30 per hp., depending upon the amount of reserve oil which is to be kept in storage. For a central station of 5000 hp., the complete oil burning equipment with storage tanks for five months' supply of oil has been estimated at $250,000 which would be at the rate of $50 per hp. An industrial plant could of course get along safely with much less than a five months supply of oil on hand, but in almost any plant there will be little if any decrease in first cost in favor of fuel oil.

The air to the oil burners should be cut down for best economy so that a slight haze is emitted from the chimney. Any additional air will stop the smoke completely, but it will be a lot in excess of the amount needed for combustion and will, of course, reduce the efficiency of operation. The mechanical stoker is every

*From a paper presented at a meeting of the Boiler Manufacturers' Association at New York, Jan. 8. The author is general manager, Sanford Riley Stoker Co., Worcester, Mass.

bit as good as oil burning as regards this feature of smoke. Some stoker installations can be criticized for carrying solid particles of finely powdered ash up the chimney, but as an offset to this, the waste gases from a fuel oil plant have an extremely unpleasant odor which is very objectionable in thickly settled communities.

The underfeed stoker of to-day can raise a boiler from banked fire to 300 per cent of rating or more in from five to ten minutes. The plant with fuel oil cannot boast of any quicker response than this. The underfeed stoker can be shut down from high capacity almost as quickly, and would not compare unfavorably with the oil burner where it is merely necessary to stop the supply of fuel to shut down the boiler. In either case, the heat stored up by the brickwork of the furnace is the limiting feature in time required to shut a boiler down.

Storage Space Required

We will assume an average calorific value for fuel oil of 18,000 B.t.u. per lb. We will assume an average calorific value for bituminous coal of 13,500 B.t.u. per lb. The specific gravity of fuel oil will average about 0.95, which means that a cubic foot of the oil

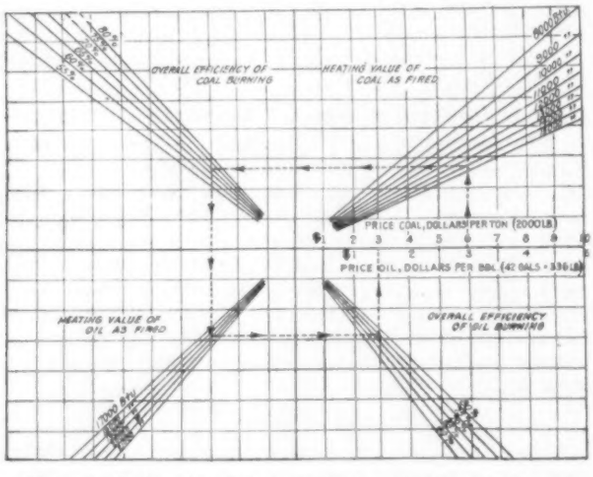

OVERALL EFFICIENCY OF COAL BURNING
HEATING VALUE OF COAL AS FIRED
PRICE COAL, DOLLARS PER TON (2000 LB)
PRICE OIL, DOLLARS PER BBL (42 GALS = 336 LB)
HEATING VALUE OF OIL AS FIRED
OVERALL EFFICIENCY OF OIL BURNING

Chart to Determine What the Price of Oil of Different Grades Must Be to Compete with Coal of Various Grades at Varying Prices

would have an average weight of 59.4 lb. A cubic foot of crushed bituminous coal will average about 52 lb. Therefore, for equal calorific values, fuel oil will occupy only about two-thirds of the storage space required for coal. On board ship this is very important, but on land the fuel oil is stored in tanks and these tanks cannot be placed too close together on account of the insurance regulations. Coal on the other hand can be stored in one continuous pile and the land occupied for the storage of fuel oil would amount to as much as that required for storing an equal calorific value of coal.

Refuse and Banking Losses

While it is true that the burning of fuel oil leaves no ashes to be disposed of, there is the question of the residue which is deposited on the heating surfaces of the boiler. This residue is oily and extremely hard to remove. It is highly non-conductive as regards heat. If it is allowed to remain on the boiler tubes it reduces the economy of the installation materially.

In order to remove the oil residue from the tubes it is necessary to use steam soot blowers four or five times a day. This is more often than is necessary to remove the soot from coal fired boiler tubes and results in an extra amount of steam as compared with a coal fired boiler.

In the case of a plant where fuel oil is used, and the load factor is low, there is claimed to be a considerable saving due to the fact that there are no banking losses. In the case of a stoker the coal consumption on a banked fire is approximately 30,000 B.t.u. per sq. ft. of grate surface. With 14,000 B.t.u. coal this would amount to 2.15 lb. per sq. ft. grate surface per hr. If we consider a 500-hp. boiler with a grate surface of about 80 sq. ft., the coal used per hour would amount to 172 lb. or equal to 2,400,000 B.t.u. per hr. This banking loss is offset by the additional steam which the oil burners require over that used by the mechanical stokers. This additional steam would amount to approximately 4 per cent of the boiler output.

Consider this same 500-hp. boiler fired with oil and operating at 200 per cent. of rating. The steam required by the oil burners would amount to about 40 boiler hp. This would mean an input to the boiler of 1,800,000 B.t.u. per hr., for operating the burners. If the boilers were banked 57 per cent of the time and were operating at 200 per cent of rating for 43 per cent of the time, the loss from the steam required for oil burners would be equal to the loss brought about by banked coal fires.

Fluctuations in Price

The price of oil has been subject to tremendous fluctuations in the past, varying from 2.5c per gallon in 1915 to a maximum of 7c during the war period. The corresponding range of coal prices from 1915 to the war period would be, in the Pittsburgh district on run-of-mine steam coal f.o.b. cars, from $1 to $2. The fuel oil market is more susceptible to disturbing influence than is the coal market. During the war practically all the fuel oil produced was used by the allied navies and there was hardly any surplus for land use. The merchant ships are now shifting over in large numbers to fuel oil burning and just as soon as any considerable percentage of them are changed over the price of fuel oil will rise. The supply of oil is limited and any large increase in use will send prices up.

Fire Risk

The fire underwriters make some quite stringent restrictions on the use of fuel oil. The oil must be stored underground in concrete or steel tanks and the top level of the oil must be below the level of the burners and pumped to the burners. Any gravity feed of the oil to the burners is prohibited on account of the risk of heating and subsequent explosion when the boilers are started up. If the oil cannot be stored underground on account of tidewater, ledge or any other reason, it may be stored in concrete or steel tanks above ground, provided they are located 150 ft. away from the nearest building. Each tank must be surrounded by an earthwork or concrete dike of a capacity equal to one and one-half times the capacity of the tank. This is to catch the oil in case the tank should burst for any reason. The capacity is specified as one and one-half times the tank so as to allow for snow or rain water standing in the bottom of the dike. If for any reason the above ground tank cannot be located 150 ft. away from the building, it must be buried in earth above ground—that is, the earth must be piled up upon the tank so as to completely cover it. There is considerable danger of igniting the fuel oil from lightning discharges. All tanks should be provided with a steam line connection for suffocating the fire or some other form of fire extinguisher should be provided, such as carbon dioxide gas, foamite, etc. If all of the above precautions are taken and if the layout of the proposed oil burning plant is submitted to the fire underwriters for approval, there will generally be only a slight increase in the fire insurance rates on adjacent buildings.

The Lochiel furnace of the American Manganese Mfg. Co., near Harrisburg, Pa., blown in on Jan. 1, after a shutdown of about nine months, will be devoted exclusively to the production of ferromanganese, using ores from Cuba, Brazil and India. It is said that the output is sold for the next six months. F. F. Amsden is local general manager for the company.

The Marshall furnace, Newport, Pa., is arranging for a resumption of operations at an early date. The stack was shut down last spring and has been repaired and overhauled since this time. Production will be devoted to high grade pig iron.

BUYING FROM GERMANY

Exchange Rate Favors That Country—Preference for Large American Tools

A partner in a well known export firm, who recently returned from a business trip to France and England, says that while a great many purchases of machine tools are being made in Germany by other European countries, the buyers realize the superiority of American made machinery and deal with German manufacturers only because of the rate of exchange. The various attempts of American and other foreign interests since the armistice to purchase German manufacturing plants, with the intention of manufacturing at low costs with the mark and later selling in dollars when the exchange rate improves, is being frowned upon by the German Government, which in many cases has purchased the output of plants, reselling for export at a higher price than that demanded by the manufacturer, in order to keep German goods from being cheapened. While the general satisfaction given by German small machine tools will probably retain for them much of the market in Europe, large tools of American make are admittedly better, and as the demand since the war is greater than ever before for machinery on a large scale for quantity production and labor saving, this exporter believes that eventually, with satisfactory exchange rate, the American machine tool will displace the German in many European markets.

This exporter was approached several times in France by representatives of both French and Belgian companies with offers to purchase material at prewar rate of exchange, leaving the difference on a credit balance for a period of two years. There is apparent a slight feeling of irritation on the part of the French against both the British and Americans, upon whom they seem to place part of the blame for the low condition of exchange.

Steel Shortage in Great Britain Due to Labor Shortage

WASHINGTON, Jan. 13.—Reports to the Bureau of Foreign and Domestic Commerce from London tell of the shortage of steel in Great Britain. A cablegram from Consul General Robert P. Skinner, at London, says that shipbuilding has been stopped at Dundee owing to a shortage of steel plates, and that shipments from America are being awaited.

British trade and industrial notes forwarded by Alfred Nutting, clerk in the American consulate general at London, included the following reference to the demand for steel: "Of steel for rolling down billets and sheet bars a shortage exists in Great Britain, owing to excessive demand. Much of the material used recently in Birmingham for steel is being diverted to the Welsh tin plate trade. Prices of billets now range from £15 10s. to £16 15s. ($75.43 to $81.51 normal exchange) per ton, and sheet bars £15 10s. per ton. Meantime puddlers in iron works—whose wages are based on tonnage—are earning £1 5d. ($8.25) a ton in place of 9s. 6d. ($2.31) a ton before the war."

An enumeration by Mr. Nutting of the trades and industries in which a shortage of labor exists in Great Britain includes the iron and steel works where puddlers and mill men are required, pig iron industry, shipbuilding where shipwrights and riveters are wanted, tin plate and steel sheets, where one-third of the available mills are idle for lack of labor.

Considerable interest has been roused by the formation of a motor vehicle manufacturing combination comprising over half a dozen businesses, Mr. Nutting says, each specializing in a special part of an automobile. The combination will be in effect a complete manufacturing concern and delay in securing necessary parts will be avoided. Each of the companies is bound to supply the required parts, only a certain part of the output being sold to outside purchasers. Control of a large Sheffield steel manufacturing concern whose name has not yet been disclosed is included within the scope of the organization. The capital of the organization, known as Harper Bean, Ltd., will be $29,199,000.

Iron and Steel Trade with China

WASHINGTON, Jan. 13.—Trade in iron and steel between China and the United States is described in a report from Consul General George E. Anderson at Hongkong. "Imports of iron and steel during the first nine months of 1919 were held down to the lowest point possible," says Mr. Anderson. "Nearly the whole of the trade has been with America. Bars and plates were the heaviest arrivals, reaching an estimated value of $3,000,000 and plates a value of $2,500,000. During the latter months of the period there was a revival in the trade in tin plates, total imports reaching about $2,000,000 in value. The trade in wire nails fell off during the period, the imports for the nine months reaching a value of about $600,000. Imports of black and galvanized sheets and of all miscellaneous iron and steel materials also declined.

"Imports of machinery were greatly on the increase during the late spring and summer, especially various industrial machinery in the way of replacements and ship's machinery, both coming out of Great Britain. Imports of electrical machinery were only fair in volume, the United States having a good share of the trade. Internal-combustion engines are being imported in increasing numbers, the trade for the nine months amounting to about $150,000 in value; the United States furnished about two-thirds of these imports.

Regarding the export trade in tin from Hongkong during the first nine months of 1919, Mr. Anderson says: "For the period under consideration the declared exports of tin to the United States were valued at only $64,051 as compared with a value of $10,299,203 for the corresponding period of 1918. Shipments to Europe fell off in the same proportion. The fact is that, with war demand gone, tin from Hongkong—i.e., from the Yunnan fields—cannot be shipped to the United States and Europe in competition with Straits and other tin as long as the exchange value of silver is what it is now. The cost of the product in gold when produced on a silver basis is simply beyond reach. There has been the usual local trade in tin to Chinese ports amounting for the nine months to about 5000 short tons."

Financial Troubles in Michigan

DETROIT, Jan. 13.—Liabilities of $86,000 and assets of $45,000 are listed by the Ypsilanti Twist Drill Co. of Ypsilanti, Mich., which has gone into receivership. Frank T. Newton has been appointed receiver.

Receivership of the Regal Motor Car Co., which has been running since Feb. 12, 1918, was brought to a close last week, when unsecured creditors received checks for 7.16 per cent of their claims, making a total paid them of 22.16 per cent. The receivers handled $650,440.96. The company failed because of circumstances arising out of the war.

Eighty-three stockholders of the Olympian Motors Co. of Pontiac, Mich., have petitioned the United States District Court for appointment of a receiver for the corporation. It is alleged that officers of the company formed a company to dispose of stock contrary to law. An audit of the books under direction of the court is asked.

Profit Sharing Not Abandoned

The Willys-Overland Co., Toledo, Ohio, has issued a statement to the 13,000 workers at its plant setting forth that there will be no distribution of profits during the present month, as arranged for about a year ago, as the labor troubles commencing last May and continuing several weeks eliminated anticipated profits. The plan, however, has not been abandoned, and a new draft will be made in the near future. The first distribution, aggregating $414,000, was made shortly before the labor controversy at the works commenced.

Exports of Iron and Steel Products Decline

Loss is Not Heavy—Exports of Machinery Show Increase—Imports of Iron and Steel Heavier Than in October—More Engines Sent Abroad

WASHINGTON, Jan. 13.—Statistics on iron and steel exports and imports for the month of November, 1919, show conditions on the whole to have been much the same as in the preceding two months. The total exports of manufactures of iron and steel were in value somewhat less than in October but more than in September. The tonnage was smaller than either the October or September figures. Exports of machinery showed an increase over both September and October. Imports of iron and steel were greater than in October but slightly less than in September.

The exports of manufactures of iron and steel in November totaled in value $74,676,004 as against $76,172,791 in October and $73,378,468 in September. The total in November, 1918, in the middle of which month the armistice was signed, was $89,545,487. The total for the 11 months ending with November, 1919, was $908,891,267 as against $960,165,677 for the corresponding 11 months of 1918.

The November exports of iron and steel manufactures totaled 295,045 gross tons as against 302,456 gross tons in October and 363,505 gross tons in September. For the 11 months ending in November of this year the total was 4,202,823 gross tons as against 4,980,334 gross tons for the first 11 months of 1918. The total gross tons in November, 1918, amounted to 448,716.

Exports of various forms of pig iron in November totaled 21,429 gross tons as against 14,108 gross tons in October and 18,991 gross tons in September. In November, 1918, they totaled 30,825.

During November of this year, exports of billets, ingots and blooms totaled 13,211 gross tons, which was considerably under the October total of 20,713 gross tons and the September total of 37,513 gross tons. The November exports of billets, ingots and blooms included 360 gross tons to France as against 49,689 gross tons in November, 1918; 197 gross tons to Italy as against 14,295 gross tons in November, 1918, and 11,054 gross tons to the United Kingdom as against 54,285 gross tons in the same month of 1918. The total in November, 1918, was 150,024 gross tons. The total for the first 11 months of 1919 amounted to only 236,886 as against 1,722,399 gross tons during the final 11 months of the war.

Steel rails exported in November, 1919, totaled 54,342 gross tons, which was in excess of the October total of 43,730 gross tons but less than the September total of 58,424 gross tons. In November, 1918, there were 34,590 gross tons of steel rails exported. The exports of steel rails in November, 1919, included 3362 gross tons to France compared with 10,111 gross tons in November, 1918, 535 gross tons to Canada compared with 8851 gross tons in November, 1918, and 409 gross tons of Mexico as against 138 gross tons in the same month of 1918.

Steel plates exported in November, 1919, amounted to 63,684 gross tons as against 40,660 gross tons in

Exports of Iron and Steel

	November		Eleven months	
	1918 Gross Tons	1919 Gross Tons	1918 Gross Tons	1919 Gross Tons
Ferromanganese	110	79	3,566	2,996
Ferrosilicon	389	1	3,635	4,797
All other pig iron	30,326	21,349	237,749	298,856
Scrap	7	6,289	2,129	23,303
Bar iron	7,460	2,986	53,260	58,769
Wire rods	13,027	8,508	137,773	111,141
Steel bars	37,080	4,673	540,147	481,912
Billets, ingots, blooms, n.e.s.	150,024	13,211	1,722,399	236,886
Bolts and nuts	2,878	2,223	23,096	37,398
Hoops and bands	4,921	2,810	46,981	47,126
Horseshoes	78	163	2,668	3,222
Cut nails	219	160	3,572	2,839
Wire nails	8,865	4,729	73,010	86,503
Wood screws	...	...	...	...
All other nails, including tacks	1,025	769	10,830	15,388
Cast pipes and fittings	1,886	4,976	54,258	35,178
Wrought pipes and fittings	8,152	15,152	81,985	324,447
Radiators and cast-iron house-heating boilers	385	250	2,400	4,019
Railroad spikes	865	1,046	9,294	23,850
Steel rails	34,590	54,342	410,215	618,300
Galvanized sheets and plates	6,034	8,331	64,742	95,626
All other sheets and plates	1,554	2,136	38,898	38,080
Steel plates	56,846	63,684	488,974	662,253
Steel sheets	8,862	13,147	153,292	169,198
Ship and tank plates, punched and shaped	2,972	1,710	28,613	12,903
Structural iron and steel	16,262	22,939	204,669	345,177
Tin and terne plates	17,828	18,935	207,807	189,153
Barbed wire	23,190	8,665	231,039	91,293
All other wire	12,881	11,782	145,362	182,210
	448,716	295,045	4,980,334	4,202,823

Imports of Iron and Steel

	November		Eleven Months	
	1918 Gr. Tons	1919 Gr. Tons	1918 Gr. Tons	1919 Gr. Tons
Ferromanganese	520	6,921	26,991	29,595
Ferrosilicon	1,467	1,388	4,077	8,623
All other pig iron	.....	14,574	1,973	50,670
Scrap	2,880	15,175	43,426	157,075
Bar iron	136	220	1,421	1,574
Structural iron and steel	798	168	3,492	958
Steel billets without alloys	3,453	3,777	31,240	9,432
All other steel billets	751	278	6,998	2,321
Steel rails	68	480	6,830	15,736
Sheets and plates	103	244	1,486	1,005
Tin and terne plates	.....	73	32	224
Tin scrap	492	498	5,951	5,016
Wire rods	171	32	7,677	236
	10,839	43,828	151,257	282,465
Manganese, oxide, and ore of	38,580	11,694	469,879	296,968

Exports, 1919—January to November

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
Total	3,985,161	295,070	237,369

October and 52,885 gross tons in September. The November, 1918, figure was 56,846. There were exported to France in November, 1919, only 747 gross tons of steel plates as against 5345 gross tons in November, 1918, while exports to the United Kingdom for the same months were respectively 1479 gross tons and 3830 gross tons.

Exports of structural iron and steel in November, 1919, amounted to 22,939 gross tons, which was less than the October total of 26,141 gross tons but more than the September total of 21,933 gross tons. The total in November, 1918, was 16,262 gross tons.

Exports of machinery in November, 1919, were valued at $34,103,136, which was more than the October total of $33,530,888, which was in turn an increase over the September total of $29,655,048. During the 11 months ending in November, the exports were valued at $351,916,828 as against $257,412,268 for the same months of 1918.

Metal working machinery exported in November, 1919, was valued at $4,546,045, which was not much less than the November, 1918, total of $4,689,040. For the 11 months of 1919, the total was $55,102,262, while for the 11 months of 1918 it was $48,222,960.

Steam engines exported in November of this year were valued at $1,466,198, while those exported in November, 1918, were valued at $923,333. The total in October, 1919, was $5,698,233 and in September, $2,675,285. Sugar mill machinery valued at $2,392,163 was exported in November, 1919, as against $1,807,312 in October and $1,227,768 in September. Textile machinery valued at $1,342,595 was exported in November while the total in October was $1,148,503 and in September, $1,371,923. Typewriting machines valued at $1,258,395 were exported in November, 1919, as against $1,494,840 in October, 1919, and $819,417 in November, 1918.

An increase in imports of iron and steel in November, 1919, resulted in a total of 43,828 gross tons as against 40,705 gross tons in October. The September total, which was almost the same as in November, was 43,892 gross tons. The total for the 11 months of 1919 was 282,465 as against only 151,257 gross tons during the corresponding months while the war was still in progress and imports were cut off to a large extent.

Imports of scrap during November, 1919, totaled 15,175 gross tons as against 19,673 gross tons in October and 24,668 gross tons in September. The total for November, 1918, was 2880 gross tons. The imports during the 11 months periods of 1919 and 1918 were respectively 157,075 gross tons and 43,426 gross tons.

Pig iron of various kinds which was imported during November totaled 22,883 gross tons as against 18,381 gross tons in October and 17,838 gross tons in September. The total in November, 1918, was 1987 gross tons. The 11 months total in 1919 was 88,888 gross tons as against 33,041 gross tons in 1918.

Imports of manganese ore and oxide of manganese totaled 11,694 gross tons in November, 1919, as against 16,863 gross tons in October. The total in November, 1918, was 38,580 gross tons. The total for the 11 months of 1919 was 296,968 gross tons as against 469,879 in 1918.

O. F. S.

Exports of Machinery

	November		Eleven months	
	1918	1919	1918	1919
Adding machines	$294,891	$208,087	$1,837,825	$3,642,668
Air-compressing machinery	214,771	189,108	2,413,494	3,360,352
Brewers' machinery	36,686	7,178	128,312	156,222
Cash registers	133,187	504,999	673,397	3,778,542
Parts of	19,468	26,192	95,699	264,236
Concrete mixers	7,998	50,978	295,231	217,239
Cotton gins	15,428	2,348	100,677	292,114
Cream separators	63,436	41,100	711,403	1,053,630
Elevators and elevator machinery	390,797	82,043	1,999,895	2,475,645
Electric locomotives	42,255	37,204	140,890	827,992
Gas engines, stationary	12,020	92,868	439,915	626,882
Gasoline engines	1,718,200	1,884,344	32,557,341	36,674,565
Kerosene engines	1,453,489	568,140	7,542,271	7,574,997
Steam engines	923,333	1,466,198	27,314,556	29,049,781
All other engines	867,483	187,176	5,044,430	3,202,040
Boilers	450,404	976,528	4,081,605	5,960,807
Boiler tubes	846,539	269,633	5,745,312	7,635,249
All other parts of engines	1,638,026	6,840,783	21,294,755	28,201,638
Excavating machinery	15,847	139,131	1,178,154	1,027,660
Milling machinery, flour, grist	152,622	251,876	1,236,867	2,268,838
Laundry machinery, power	18,049	145,739	375,012	744,791
All other	33,701	31,893	229,625	352,016
Lawn mowers	49,736	17,601	209,481	455,296
Metal-working machinery (including wood-working tools)	.....	.....	.....	.....
Lathes	503,158	647,801	9,161,076	9,529,145
Other machine tools	1,949,802	1,006,544	10,829,826	11,653,383
Sharpening and grinding machines	351,292	438,979	5,779,909	5,249,197
All other metal-working machinery	1,884,808	2,452,721	22,452,149	28,670,537
Meters, gas and water	42,831	50,970	375,602	709,994
Mining machinery, oil well	313,803	453,885	2,521,998	3,264,792
All other	552,231	579,462	8,169,100	8,805,558
Paper-mill machinery	174,359	157,136	1,466,052	3,612,740
Printing presses	249,924	422,141	1,315,003	3,326,894
Pumps and pumping machinery	552,738	758,104	5,519,064	8,262,490
Refrigerating and ice-making machinery	206,161	159,544	1,356,896	2,022,065
Road-making machinery	33,506	88,973	575,280	922,315
Sewing machines	982,977	1,191,229	7,318,234	11,518,947
Shoe machinery	124,176	144,770	1,181,259	2,546,848
Sugar-mill machinery	1,201,792	2,393,163	8,146,472	12,479,028
Textile machinery	775,772	1,342,595	6,560,911	13,933,096
Typesetting machines	148,435	228,384	1,200,312	3,640,386
Typewriting machines	819,417	1,258,395	6,535,775	15,763,402
Windmills	84,805	90,709	719,084	977,577
Wood-working machinery, saw mill	169,069	35,671	1,014,966	1,085,099
All other	153,617	223,058	957,741	2,380,855
All other machinery and parts of	3,987,519	5,957,955	28,609,412	67,718,780
	$24,570,538	$34,103,136	$257,412,268	$351,916,828

More Activity in Canada

TORONTO, ONT., Jan. 12.—In some towns and cities in Canada there was considerable activity for the last month of 1919, especially in plants turning out machinery, iron and steel products, etc. While the greater part of these plants experienced a busy month, some cities report that activities were of a quiet nature, but that the outlook for the early part of 1920 was exceedingly bright. Continued improvement is reported in the steel industry at Sydney and Sydney Mines, N. S., with good prospects for an active winter. The December output of the Dominion Steel Co.'s plant at Sydney was in tons as follows: Pig iron, 9900; ingots, 15,700; billets and blooms, 11,400; rods, 6250; merchant mill, 600; wire, 500; nails and staples, 1000. Sixty ovens and one blast furnace were in operation, and work on the plate mill was progressing satisfactorily. Rolling mills in Halifax, N. S., were busy, and construction work in shipbuilding yards and drydocks was active, and all iron workers in the district were fully employed.

"Our Part in the World War" is the subject of a 48-page book issued by the Morgan Engineering Co., Alliance, Ohio. Views and descriptions are given of large disappearing gun carriages for coast defence, 12-in. mortar railway mounts, caterpillar tractor gun mounts, etc., built by this company during the war. Views taken in the company's plant are included.

The Ohio Body & Blower Co.

The Ohio Body & Blower Co., whose formation was recently announced, is an outgrowth of the Ohio Blower Co. The latter company had a modest beginning, and its chief article of manufacture was the Swartwout helico-centrifugal exhaust head, but it also engaged in the manufacture and erection of dust-collecting systems. The cast iron exhaust head proved to be the first of a line of steam specialties, including steam and oil separators, the hydromatic steam trap, water-level control valves, and feed-water heaters. Out of the sheet-metal department came the Swartwout rotary ball-bearing ventilator, followed by the manufacture of steel core ovens of both the truck and the shelf type. The recent active shipbuilding program of the country resulted in the Swartwout standardized ship cowl with turning gear.

The cessation of war activity then brought about a radical step in that the directors voted to enlarge facilities for a department to build motor bodies on a large scale. The Ohio Body & Blower Co. will take over three plants from the older company. Plant No. 1 is of three stories on Perkins Avenue, Cleveland, which served for five years as the exclusive home of the company. Plant No. 2 is the new plant, housing the home offices on Detroit Avenue, Cleveland. Plant No. 3 is a modern foundry at Orrville, Ohio, operated exclusively on Ohio Blower Co. work. The three plants provide normally for the employment of 600 workers in 150,000 sq. ft. of floor space. The plans for expansion provide for an increase to 1000 workers and 350,000 sq. ft. of floor space by the addition of another unit to plant No. 2, to be devoted to the building of closed bodies.

The officers of the older company, D. K. Swartwout, president, and H. H. Lind, vice-president, assume the same offices in the new corporation.

Fuller Company Buys Shipyard

The George A. Fuller Co. has purchased the shipyard of the United States Shipping Board Emergency Fleet Corporation, located at Wilmington, N. C., and will carry on the operation of the plant beginning Jan. 1, which was built in 1918 by the Carolina Shipbuilding Corporation, superintendent for the United States Shipping Board Emergency Fleet Corporation. The Carolina Shipbuilding Corporation contract included, in addition to the construction of the plant, the construction of 12 9600-deadweight-ton cargo steamships, equipped with reciprocating engines.

The Carolina Corporation was a subsidiary of the George A. Fuller Co., incorporated for the purpose of executing this contract. Under the new arrangement the George A. Fuller Co. will complete eight of the 12 ships named in the previous contract for the Fleet Corporation for a lump sum price and will build the remaining four of the ships for its own account for sale.

Improvements at Lackawanna

The Lackawanna Steel Co., Buffalo, N. Y., during 1919 completed the construction of a two-high 8-in. merchant mill. It is motor driven and has four weighing and nine finishing stands. The company is also building 60 Semet-Solvay coke ovens and installing a new 7500-kw. turbo generator for the power house.

Company Rapidly Expanding

An indication of the rapid growth of the automobile industry during the past year is shown in the affairs of the Pressure Proof Piston Ring Co., Boston, which operates plants at Needham Heights, Mass., and Fostoria, Ohio. These two plants to-day are producing more than three times what they were a year ago, and when contemplated improvements are completed the output will be increased a third. The company has enough business on its books to-day to keep both plants operating at capacity for considerably more than a year.

Little or no trouble in securing raw material and fuel was experienced during the steel and coal strikes. The engineering department is designing machine tools, to be built by the company itself. The concern is not in the market for machine tools.

The management and others are interested in the Pressure Proof Rings, Ltd., Sherbrooke, Canada, located about half way between Montreal and Quebec, which has been producing about two months. The Canadian company is a separate organization and not a subsidiary of the Pressure Proof Piston Ring Co. of Boston.

Takes Over Dayton Companies

The National Steel Products Co., Dayton, Ohio, has been incorporated to take over the combined plants and assets of the National Vacuum Machinery Co. and the Crown Hardware Mfg. Co., with greatly enlarged capital and additional facilities for the expansion of the business. The company will specialize in the manufacture of the "Ream" universal joint, steel specialties, tools and dies. It will also continue the manufacture of Crown plating machinery and accessories. The officers are: J. G. Petosky, president; T. M. Hiester, vice-president and general manager, and Joseph G. Lehman, secretary and treasurer.

Extinguisher Company Changes Name

Because the business of the General Fire Extinguisher Co., Providence, R. I., has included considerable more than fire extinguishing piping equipment, its sales and contracting business was taken over on Jan. 1 by a new company, Grinnell Co., Inc. Besides fire protection this company will specialize in power and process piping; steam, hot water and gas heating; drying and sales of pipe, fittings, valves and supplies. The original company was founded in 1850 to make steam and gas piping and about 20 years later became a pioneer in the manufacture of automatic sprinklers.

Krupp's First Locomotive

The first locomotive built by the Krupp works at Essen made its trial trip recently, says the London *Ironmonger*. The engine, attached to a train of 10 trucks, the whole decorated with flags and wreaths, was driven through the workshops by Herr Krupp in person, amid the cheers of the men. The Krupp works have always produced engines and wagon parts, but the manufacture of railroad locomotives was only planned after the revolution. It is expected that the works will turn out on an average one engine and 10 cars daily.

Iron Company Sold

The Federal Court has confirmed the auction sale of the Barnum-Richardson Co., Lime Rock, Conn., pig iron manufacturer, to Eugene E. Anderson, of Sharon, Pa., representing a syndicate. The price paid for the property was about $250,000. The company has two charcoal blast furnaces at East Canaan, Conn., and one at Lime Rock, Conn. It also operates an ore mine at Salisbury, Conn.

The Reed-Prentice Co., Whitcomb-Blaisdell Machine Tool Co. and Becker Milling Machine Co. are continuing their export business at 24 Stone Street, Room 1707, New York, as heretofore. Since the resignation of their former export representative, the work is being carried on by new personnel and it is requested that all inquiries for export be referred to the New York office.

The Crucible Steel Co. of America, Pittsburgh, will soon start its Norwalk, Ohio, plant, which has been idle for more than a year. This plant makes hammered and rolled machinery, spring and tool steels, also die blocks, discs, carbon and alloy tool steels. It has an annual capacity of about 20,000 tons of rolled and 3000 tons of forged steel products.

SHORT TRADE ITEMS

The executive quarters of the Employers' Association of Eastern Massachusetts, Boston, within a short time will be moved from the top floor, 166 Devonshire Street, to the first floor in the building at the corner of Purchase and Congress streets. George D. Berry is secretary of the organization.

B. A. Hapgood, associate secretary of the Springfield, Mass., Chamber of Commerce, has begun an industrial survey of manufacturing concerns in that city. Questionnaires asking the manufacturers the nature of their work, the value of their 1918 product, the amount of capital invested, the source of supply, the number of employees, etc., have been mailed out.

Influential business men of Milwaukee have formed the American Constitutional League, non-sectarian and non-racial in membership and purpose. Its activities will be confined solely to Americanization work, which will embrace all forms of education and publicity in favor of Americanism and in opposition to all radical doctrines which have for their purpose the overthrow of our existing form of representative government and our present social and industrial order. Frank R. Bacon, president Cutler-Hammer Mfg. Co., Milwaukee, has been elected chairman.

The Thomas Spacing Machine Co., Pittsburgh, has purchased the line of open back inclinable presses of the Sidney Power Press Co., Sidney, Ohio, including the entire business of the company, with all patterns, drawings and stock material, and these machines are now being manufactured at the Pittsburgh plant.

Witherbee, Sherman & Co., 2 Rector Street, New York, recently installed at its blast furnace at Port Henry, N. Y., a single strand pig-casting machine, designed by the Pittsburgh Coal Washer Co. They are also having plans prepared for a new fertilizer warehouse on Westerlo Isle, near Albany, N. Y.

Of the 18,239 disabled soldiers taking courses offered by the Federal Board, 5079 are electing trade and industrial training, which is the largest in any group. Other groups are taking business and commercial, prevocational, agricultural or professional training.

The firm of William Vander Koogh & Co., iron and steel scrap, having been dissolved by the recent death of William Vander Koogh, has been incorporated as William Vander Koogh & Co., Inc., and has purchased the business equipment, good will and trade name of the old firm and will continue at the old place of business at 38 Park Row, New York. The officers of the new corporation are: President, Elmer E. Fingarr; vice-president, A. E. A. Vander Koogh, widow of the deceased; treasurer and secretary, Josephine MacKnight.

"Vocational Training for Foundry Occupations" was discussed in detail at the recent convention of the American Foundrymen's Association by J. C. Wright, of the Federal Board for Vocational Education, and a copy of his paper may probably be obtained by addressing the secretary of the association, C. E. Hoyt, Harris Trust Building, Chicago.

The monthly meeting of the Association of Iron and Steel Electrical Engineers was held in the Hotel Chatham, Pittsburgh, Saturday evening, Dec. 20. The subject of "Steam vs. Electrically Driven Mills" was discussed, and papers presented illustrating steam and electric drives in actual operation.

A line of small motors designed with shafts removable without disturbing either the core or commutator, has been put upon the market by the Zobell Electric Motor Corporation, Garwood, N. J. The arrangement is such that the commutator also may be removed without disturbing the shaft or core.

The Read Machinery Co., Glen Rock, near York, Pa., has distributed bonuses, based on wages, to about 225 employees, aggregating $10,000. This is in addition to the regular bonuses received by the men.

The Buffalo Foundry & Machine Co., Buffalo, is giving employees who served in the war and who have now returned to the plant one-half of the amount they would have earned at their regular employment during the term of service.

The Steel Equipment Co., Avenel, N. J., gave a dinner to its employees on Christmas eve. Following the dinner, gold pieces were distributed to all workers at the plant, including the office force.

The International Oxygen Co., main offices at Newark, N. J., is establishing a new oxygen hydrogen generating plant at Toledo, Ohio. The plant will have a capacity of 3,000,000 cu. ft. of gas per month. The company has over 200 plants in operation in the United States and foreign countries.

The Capitol City Iron Co., Harrisburg, Pa., recently organized, is planning the early operation of its new plant now in course of erection on Sixth Street, near Division Street. The main building will be 78 x 308 ft., and with other structures will be equipped for the production of bar iron. It is proposed to develop a capacity of about 1000 tons a month. A. L. Ensminger, formerly connected with the Harrisburg Pipe & Pipe Bending Co., is president; Max Williams is vice-president, and Wolf Freedman, treasurer. These two latter officials are now operating a local scrap iron business.

William B. Pollock Co., Youngstown, Ohio, is filling an order for hot metal cars and other steel department equipment for delivery to China. The company recently received an order for gas producers from the Weirton Steel Co., Weirton, W. Va.

Plans to double the size of its plant have been completed by the Heltzel Steel Form Co. of Warren, Ohio, and additions are to be started immediately. The company will add heavier forms to its products. Contract for the steel in its new building has been awarded the Ohio Structural Steel Co., Newton Falls, Ohio. A 10-ton electric crane will be installed.

The American Manganese Mfg. Co., Dunbar, Pa., will blow in one of its blast furnaces shortly on foundry pig iron, and will have an output of about 300 tons per day. The other furnace will continue to make ferromanganese, on which both stacks operated during the war and for some months after it was over.

The Wilson-Snyder Mfg. Co., Pittsburgh, manufacturer of pumps and pumping machinery, has bought the plant of the Braddock Mfg. Co. at Braddock, Pa. This plant was originally a general foundry and machine shop, but during the war was operated in the manufacture of steel castings and slugs for war work. The Wilson-Snyder Mfg. Co. will manufacture in the plant pumps for steel plants and for other large industrial plants, also for oil pipe lines and refinery work. Later new machinery will be added for the manufacture of pipe equipment. The Wilson-Snyder Mfg. Co. will continue to operate its present shops on Ross Street, Pittsburgh, and bought the Braddock plant in order to take care of its increasing business. The new plant will more than double its capacity in the manufacture of its products.

Tate Jones & Co., Inc., Pittsburgh, furnace engineer for the erection of complete oil and gas burning installations, sends out a house organ styled "The Buckstay," a recent issue of which contains an illustrated description of a semi-producer forging furnace and waste heat boilers, completed recently by this company for the Burke Steel Co., Rochester, N. Y.

Since the war demand for benzol and toluol, produced in by-product coke oven operation, has fallen off to such an extent that the process has been simplified in some districts and the benzol, toluol and part of the solvent naphtha are distilled off together and marketed

as motor fuel. The remainder of the solvent naphtha is recovered and sold as such. This practice is followed by steel corporations in the Youngstown, Ohio, district.

The Yough Electric Repair Co., Connellsville, Pa., is having plans prepared for a repair shop, but will not build a power plant, as stated. Some new equipment will likely be needed.

Papers prepared by F. W. Funk, P. H. Zenk and C. A. Oglesby were read Dec. 30 at a meeting of the Engineers' Club of the Youngstown district at Youngstown, Ohio.

The Brown Hoisting Machinery Co., Cleveland, has for its 1920 calendar a series of heavy sheets, 12x18½ in. The sheets, one for each month, are black-coated and the calendar figures are white. The upper half of each sheet is a half-tone view of a Brown installation, included among these being the unloaders at the U. S. Army docks in France, the National Tube Co.'s ore yard at Lorain, Ohio, the Brownhoist monorail trolleys at the National Transit shops, and the unloaders at the Rogers-Brown Iron Co.'s docks at Buffalo.

The Falcon Steel Co., now building a sheet mill plant at Niles, Ohio, expects to have it completed and in operation about March 1, or shortly after that date. Paul Wick is vice-president and general manager of the company.

The United States Civil Service Commission announces examinations for civilian aids as follows: For purchasing, shipping, salvage, steel and metal, stock upkeep, electrical stock, ordnance stock, fuel supply, and storehouse superintendent, The salary is $11.36 per day. Applicants should apply for form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board, at the nearest custom house.

Mercury vapor rectifiers for transforming high-tension alternating current into direct current have been developed by Brown, Boveri & Co., Ltd., Westminster, London, S. W., England. The apparatus consists of a steel cylinder with mercury airtight joints throughout to maintain the vacuum. Units have been constructed up to 660 hp.

The Victor Saw Works, Springfield, Mass., held its annual salesmen's convention in that city, Jan. 2 and 3. Reports as to the past year were very satisfactory, as are also the prospects for this year. The company has been especially pleased with the co-operation of the dealers.

Freyn, Brassert & Company, engineers, Chicago, have been awarded contracts for a considerable number of Birkholz-Terbeck gas burners for blast furnace gas and coke oven gas, and Steese hydrocarbon burners by the Semet-Solvay Co., Steel & Tube Co. of America, Punxsutawney Furnace Co., Algoma Steel Corporation, Wellston Iron Furnace Co., Pittsburgh Crucible Steel Co., Joseph E. Thropp, Everett, Pa., Heppenstall Forge & Knife Co., Pittsburgh, and Shelton Iron, Steel & Coal Co., Stoke-on-Trent, England, and Carnegie Steel Co.

The Atlas Machinery & Supply Co., 1416 Syndicate Trust Building, St. Louis, Mo., has been appointed to represent the American Steam Conveyor Corporation, Chicago, in the St. Louis district. The Atlas Machinery Co. is a new sales organization headed by William H. Patton, recently discharged from the United States Army. Associated with him is his brother, W. R. Patton, who has traveled the Central West selling power plant equipment for the past 20 years. N. B. Stewart, identified with the power plant machinery business in St. Louis for about 25 years, is also associated with the company.

Moorehead Brothers & Co., Inc., Pittsburgh, has started its puddling department after being idle two months, and will put its plate mills in operation within a short time. This plant contains 40 single puddling furnaces, a 16-in. bar mill and a 30x100-in. mill for rolling sheared plates.

OFFICE CHANGES

The Shawinigan Electro Products Co., 1611 Lexington Building, Baltimore, has changed its name to the Baltimore Electro Alloys Co.

The Hawkeye Lightning Rod Co., Riverside, Iowa, has removed to its new plant at Cedar Rapids, Iowa. No office will be maintained at the Riverside plant, all shipments being made through the new one.

Anson W. Richards, 149 Broadway, New York, dealer in machine tools, will be known in the future as Perkins & Richards, with offices at the same address.

The W. J. Clark Co., Salem, Ohio, has changed its name to the Mullins Body Corporation.

L. Best Co., 75 Barclay Street, New York, grinding, polishing machinery and supplies, has removed to 28-30 West Broadway.

F. C. Thornley & Co., constructing and consulting engineers, specializing in mechanical labor saving systems, fuel problems, locomotive coaling stations, terminals, distributing yards and industrial plants, is opening offices at 31 West Forty-third Street, New York. Until these offices are ready for occupancy the company is located at 18 West Thirty-fourth Street.

The F. H. Bultman Co., 2108 Superior Avenue, N. W., Cleveland, has removed its offices and factory to 10271 Berea Road, Cleveland. The company specializes in gearing and sprockets of all kinds.

The American Steel Tube Co., formerly at 369 Erie Street, Toledo, Ohio, is now at Buckeye Street and the Toledo Terminal Railroad.

The Stalnaker Steel Co., Frick Building, Pittsburgh, dealer in old material, has opened an office in room 410 Moffat Building, Detroit, with William S. Boyd in charge, as district manager of sales in the Detroit territory. Mr. Boyd, for the past 15 years, has been connected with the Pittsburgh Steel Co., Crucible Steel Co. of America and the Page Steel & Wire Co. in the capacity of purchasing agent.

The National Enameling & Stamping Co., Granite City, Ill., is planning to construct six modern sheet mills. In 1919 the company completed and put in operation three 60-ton open-hearth furnaces.

The Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., is making an addition to its machine shop, 60 x 187 ft., which is to be equipped with large planers, boring mills and lathes. This is expected to enable the company to produce and machine castings up to 50 tons.

The Massachusetts Blower Co., Boston, announces that it has reopened its Boston office, which is now located in the Kimball Building, 18 Tremont Street, Boston, in charge of A. C. Bartlett.

The John F. Byers Machine Co., Ravenna, Ohio, announces the opening of its new Chicago district office, 20 West Jackson Boulevard, Chicago, in charge of E. L. Kelzer.

New Boston Shipyard

Papers are being prepared for a new $20,000,000 Boston shipyard, details of which should be completed within a week. It will be a ship repair, not a construction affair. James L. Bryne, 53 State Street, Boston, contracting engineer, marine interests and others are back of the project, and the Government authorities are lending their support to the new enterprise.

Four hundred thousand square feet of land have been leased from the East Boston Co. for a period of 50 years. The initial annual rental is $12,000. The terms of the lease call for a reappraisal of the land every 10 years. Mr. Bryne estimates that between 2500 and 3500 men will be employed at the plant.

The Wisconsin Steel Co., South Chicago, Ill., has fired the second of its two new 88-oven by-product coke batteries.

MACHINING BEARINGS

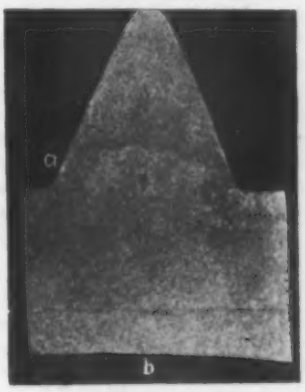
Oil Grooves and Tight Fitting Bushings—Effects of Improper Tooling

Common errors in designing and machining bearings was the subject of a paper presented by Christopher H. Bierbaum, vice-president, Lumen Bearing Co., Buffalo, before the recent annual meeting of the American Society of Mechanical Engineers, New York. After presenting ten principles relating to the design, construction and operation of journal bearings, Mr. Bierbaum gave specific applications of these laws. An illustration was shown of the correct method of lubricating a crankpin bearing and the disadvantages of pipe fitting bushings were pointed out.

Bushings, the speaker said, should be driven in with just enough pressure to prevent looseness during operation. "When a bushing is driven in too tight, although it has been reamed before being placed in service, the amount of clearance which it will then have becomes a matter of guesswork and the amount of oil-film space provided an uncertainty." For all ordinary machinery, it was explained, it will suffice if the bushing is driven in place with a blow of the hand or with a small block of wood.

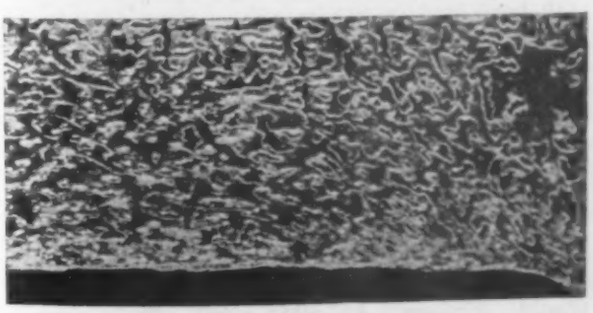
The finishing of bearings in such a manner that they may expand while warming up was emphasized as of considerable importance, and an illustration of the method of accomplishing this on the brasses of a crankpin bearing was shown.

The proper design of bearings as to strength and proper methods of clamping when tooling were discussed in detail. In general, Mr. Bierbaum said, bearings should be held in a manner such as to produce the least possible amount of strain and distortion.



Cross Section of a Tooth of a Bronze Worm Wheel of a Motor Truck Drive. The wheel failed to give satisfactory service, because the teeth had been finished with a dull hob

"The matter of chamfering oil-groove edges," the speaker said, "deserves special attention in that all advance edges of a bearing should be rounded and chamfered off, and the fact that this work should be done last after all of the other tooling of the bearing has been completed, is important. In all cases sharp edges of the groove prevent the formation of an adequate oil film and should be carefully avoided. For best results it is very necessary and it is also general practice that a cutting tool should have rake."



Photomicrograph of Field at a (60 Magnifications), Showing Disturbance of Crystalline Structure by the Dull Hob in Tooling

"The final finishing in bearings," Mr. Bierbaum said, "should be done by reamers or cutting heads having only one or a very limited number of cutting edges, and these cutting edges should have the proper amount of rake—such as would be given to any other proper cutting tool. Experiments made in a large manufacturing plant on bushings of the same dimensions, from the same lot of material, finished at the same time, some however, being reamed with the standard multiple-cutting-edge reamer and others with a single cutting blade, showed that after a storage of six months those bushings which had been reamed with a proper single cutting edge retained their accuracy and shape much better than those finished with the so-called standard reamer. The latter bushings exhibited a decided tendency to decrease in inside diameter and to assume inaccurate, elliptical forms. It was also brought out at this time, that not only did a superior product result from the use of a proper tool, but that by its use the production could be increased from 15 to 20 per cent.

Photomicrograph of Edge b (90 Magnifications), Showing That a Sharp Tool with Sufficient Rake Will Not Disturb the Crystalline Structure

Defects in Bearing Surfaces

"Another reason why bearing surfaces should be tooled with sharp tools having the proper amount of rake is brought out by a microscopic study of bearing surfaces. In order to obtain the full value of bearing alloys it is necessary that these alloys should be presented as bearing surfaces having their natural crystallization undisturbed. The hard or bearing crystals should be embedded in a softer material, permitting the former to adapt themselves to the journal surface. The softer crystals under proper service conditions will wear slightly below the surface of the harder crystals. In order to retain these conditions it is necessary to preserve the natural crystallization upon the bearing surfaces, but this cannot obtain where they have been mutilated by improper tooling. This mutilation of the bearing surfaces gives rise to the crushing of the harder crystals and embeds these crushed particles into a compressed material which does not function as a normal bearing alloy."

Heavy Increase in Steel Corporation Orders

Unfilled orders on the books of the United States Steel Corporation, Dec. 31, were 8,265,366 tons, compared with 7,128,330 tons on Nov. 30. This is an increase of 1,137,036 tons, against an increase for November of 655,662 tons, for October of 188,030 tons, for September of 175,535 tons, for August of 530,442 tons, and an increase for July and June of 685,506 and 610,545 tons respectively. The unfilled orders a year ago were 7,379,152 tons, or 886,194 tons less. The table below gives the unfilled tonnage for the Steel Corporation at the close of each month beginning with January, 1916:

	1919	1918	1917	1916
January	6,684,268	9,477,853	11,474,054	7,922,767
February	6,010,787	9,288,453	11,576,697	8,568,966
March	5,430,572	9,056,404	11,711,644	9,331,001
April	4,800,685	8,741,882	12,183,083	9,829,551
May	4,282,310	8,337,623	11,886,591	9,937,798
June	4,892,855	8,918,866	11,383,287	9,640,458
July	5,578,661	8,883,801	10,844,164	9,593,592
August	6,109,103	8,759,042	10,407,049	9,660,357
September	6,284,638	8,297,905	9,833,477	9,522,584
October	6,472,668	8,353,293	9,009,675	10,015,260
November	7,128,330	8,124,663	8,897,106	11,058,542
December	8,265,366	7,379,152	9,381,718	11,547,286

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons; the lowest was on Dec. 31, 1910, when the total was 2,605,747 tons.

CORRESPONDENCE

Steel versus Concrete Oil Storage Tanks

To the Editor: Oil storage tanks have been built of steel for several decades. The shortage of steel plates during the war encouraged owners to look for other materials resulting in some tanks being built of concrete. Whether concrete will prove an acceptable substitute for steel for this purpose is an open question which only time will answer.

We are privileged, however, to look about us and conjecture as to what the answer will be. If one contemplates the installation of tanks, this conjecturing and looking about, if intelligently and conservatively done, will pay large dividends.

There is no question in anybody's mind of the suitability and complete adaptability of steel for this purpose. It is, in fact, the ideal material and probably will never be surpassed, when service and cost are considered; steel tanks for the storage of fuel oil are practically "bottle tight," and will last indefinitely. The only remaining conditions to be considered are cost and delivery. Deliveries while not normal are fairly reasonable and are not to be compared with war times but on the whole the steel tank can be delivered quicker than a concrete one.

In the writer's experience as to the comparative cost of the two types of tanks, they approximate each quite closely on the average. It is a safe conclusion that there will not be much to choose from in the matter of price. The writer has in mind three distinct occasions this last autumn in which the result was as above stated.

The problem of whether one should select a steel tank or a concrete tank resolves itself into a question of suitability. We have shown that in price and delivery there is not much choice; also as to adaptability, they are about "fifty-fifty." Suitability in this case means tightness and durability. The value and usefulness of a tank depends on its tightness and its staying tight; in other words, its thorough dependability. The steel tank has proved its dependability. The writer knows of many that have been in service for thirty years, forty and even fifty years, for some of the older sheet iron tanks are not uncommon.

The thorough homogeneity of the steel tank is what makes it so dependable. What can we say about the concrete tank on the score of tightness and dependability? Also, how homogeneous is it? The word "tightness" has a different meaning when used for a concrete tank to hold water and one to hold oil. A leak in a water tank, say, ⅛ in. in diameter would be insignificant with water, say, $2 per 1000 cu. ft. or 7500 gal., but the same leak with oil at its present price would cost $10 per day.

What does a leak ⅛ in. in diameter mean to a concrete tank especially if it is buried; there could be many such leaks and no one the wiser. There are no means at our command to make absolutely sure the concrete tank is tight and will stay tight. Owing to its lack of homogeneity, due to the crude materials and methods of construction, concrete is not an ideal container for expensive liquids. Voids, crevices and porousness will always be formed and even if by good fortune a tank be made tight, the action of the frost, expansion and contraction, settlement of the soil, will all tend to crack such a rigid inelastic construction and no one would necessarily know when the damage was done.

Some insurance companies have been permitting concrete tanks (when buried) to be used for the storing of fuel oil. The commission appointed for Greater New York in its rules governing use and storage of fuel oil in Greater New York, issued Dec. 1, 1919, does not permit oil to be stored in anything but steel tanks.

As to durability, concrete as is well-known does not stand up under the attacks of vegetable oils and will disintegrate if used for storing such oils; it, however, does not seem to be injured by mineral oils. The trouble with the durability of the concrete fuel oil storage tank would be one of inability to prevent cracks and fissures from forming, due to settlement, frost, expansion, etc. The average of opinion in the engineering world relative to this subject seems to be that the concrete was a permissible substitute during the war, but that under peace conditions there are insufficient reasons to justify its use.

Good business and good engineering means: be sure, never take a chance. The steel tank is a "sure bet"; the concrete one, the hazard.

W. E. GOLDSWORTHY,
New York Manager,
Dover Boiler Works.

Cerium in Cast Iron

To the Editor: In a recent editorial in THE IRON AGE, "Rare Metals in Steel Making," reference was made to the very interesting experiments of Dr. Moldenke and others on the production of cerium-iron alloys and their use in the manufacture of cast iron. The following may be of interest in this connection:

In 1912 and 1913, while working on fluorine steel (THE IRON AGE, Jan. 22 and March 19, 1914), I made several samples of iron-cerium alloys, using mainly cast iron, as the gas furnace in my laboratory at 136 Liberty Street was not strong enough to melt steel easily. I made no tensile or other physical tests of the alloys obtained, my only interest being that of introducing the alloying metal in the form of a fluoride. Here, however, is what I consider the most interesting feature of my tests. As a source of cerium I used a natural material, fluocerite, available in substantial quantities in Sweden and, I believe, elsewhere, my samples being from Sweden. Native fluocerite has a formula, E_2O_3 .4 F_3, where E is the metal. In this case the metal appears to be a mixture of cerium and yttrium, Ce about 80 per cent, and Y from 1 to 4 per cent.

From my tests it would appear that under the action of heat the material breaks up, liberating the cerium as a metal, and the fluorine as a gas, the presence of fluorine being clearly evident in the flowery appearance of the flame, which is characteristic of fluorine compounds. As fluocerite costs a good deal less than ferrocerium, it would appear that the subject is worth further study.

LEON CAMMEN.
29 West Thirty-ninth Street, New York.

Vanadium and Transverse Rail Fissures

To the Editor: In regard to the article in THE IRON AGE, Aug. 7, 1919, by Paul Krentzpointner on "Transverse Rail Fissures," allow me to suggest that they may be avoided by the use of ferrovanadium and silicon dioxide, to be added when the manganese is added to the steel or shortly after. The amount to be added would be from ¼ to ½ lb. per 100 lb., according to the amount of the impurities contained in the steel. The following are the effects produced:

It dissolves in the carbonless portions of the steel and iron, which toughens and renders it more impervious to the carbide, and does much to prevent segregation of the carbide.

It removes the deleterious oxides and nitrides of the metals, dissolves gases and toughens the steel.

It forms complex carbides with carbide-forming metals such as chromium, nickel and other metals which may be present, thus enhancing the static strength of the steel, particularly in the shock resisting quality.

The vanadium in solid solution in the carbonless portions of iron and steel renders the metal more coherent and less liable to disintegration, and at the same time exerts a third influence by its action on the chemically combined carbon. There is an increase in the strength according to the amount of graphite present, care being taken not to have more than 0.11 per cent of vanadium in steel for rails. This is to avoid the excessive polish and hardness and to allow friction for tractive purposes. All other steels usually contain 0.22 per cent vanadium. I predict that the next five years will see the universal use of vanadium alloys in copper, brass, bronze and other metals where strength and wearing quality are desired.

FRANK BRONDER, Electrician and Chemist.
Oakdale, Pa.

Steel Strike at Last Is Declared Ended

American Federation of Labor Acknowledges Defeat—Foster Resigns—Most of Employees Have Returned to Work and Official Surrender Makes Little Difference

THE general steel strike, which started on Sept. 22 last, has finally been officially declared off by the American Federation of Labor's national committee for organizing the iron and steel workers. This was done at a meeting of the committee, held in Pittsburgh on Thursday, Jan. 8, at which time the resignation of W. Z. Foster as secretary and treasurer of the national committee was accepted, to take effect Feb. 1. James G. Brown of Everett, Wash., formerly president of the Timber Workers' International Union and chief assistant to Foster while the strike was in progress, has been elected to succeed him. Following the meeting of the committee, a telegram was sent to all local secretaries, organizers and others connected with the steel strike, stating that the strike was off, and the men were at liberty to return to work when they desire. This telegram reads as follows:

"The steel corporations, with the active assistance of the press, the courts, the Federal troops, the state police and many public officials, have denied steel workers their rights of free speech, free assemblage and the right to organize and, by this arbitrary and ruthless misuse of power, have brought about a condition which has compelled the national committee for organizing iron and steel workers to vote to-day that the active strike phase of the steel campaign is now at an end.

"A vigorous campaign of education and reorganization will be immediately begun and will not cease until industrial justice in the steel industry has been achieved.

"All steel strikers are now at liberty to return to work, pending preparations for the next big organization movement."

Little Effect at Youngstown

YOUNGSTOWN, OHIO, Jan. 13.—Calling off of the steel strike by the American Federation of Labor will make little difference in operation of iron and steel plants in the Mahoning Valley. Employers state that with few exceptions men eligible for re-employment have returned to work and so far as manpower is concerned the mills have been in steady operation for two months. There has been some dislocation of labor, skilled and semi-skilled men, such as machinists, electricians and mechanics leaving the district at the outbreak of the strike to avoid being involved in the disturbance. Some plants report they could use more unskilled labor.

Strike headquarters will be closed in Youngstown, Ohio, and most of the professional organizers have already left the city. Leaders have no excuse to offer here, but say the struggle for improved working conditions and higher wages, particularly for the common laborers, will be continued.

Approaching Normal Operations at Chicago

CHICAGO, Jan. 13.—In the opinion of local steel producers, the action of union officials in declaring the steel strike ended came too late to have any appreciable influence on the employment situation. The bulk of the strikers, they state, had previously returned to their old jobs or had gone to work at other plants. The cancellation of the strike order merely constituted an official admission of defeat by the union. If it had any effect on the situation in this district, it was at Joliet and Waukegan, where the strike was felt the longest. But even in those producing centers it is doubtful whether it resulted in much of an increase in the number of applicants for work. An important interest with plants in both these cities reports that there were just as many applicants for jobs in the week previous to the annulment of the strike as in the week following.

Production in this district has been steadily increasing ever since the coal strike and it is believed in a month or two, the mills will have recovered their normal operating efficiency. The Illinois Steel Co. is now operating at close to 90 per cent of capacity, having 11 out of 12 blast furnaces active at Gary, nine out of 11 at South Chicago, and two out of four at Joliet. One idle stack at each plant is being relined, leaving only two furnaces, one at South Works and one at Joliet available for immediate use. The latter stack is expected to go in shortly. All the finishing mills at the three plants are now operating with increasingly favorable results. The leading wire interest is also gaining in production and expects to get back to normal operating condition in a few weeks.

The operating situation at the independent mills is as good and in some instances better than in the corporation plants.

Not Ended at Buffalo

BUFFALO, Jan. 13.—The steel workers strike has not yet been declared off so far as Buffalo (the Lackawanna district) is concerned, the 800 men who are still out on strike having voted at their meeting on Saturday evening to continue on strike, although most of the married men are anxious to return if they can get back their jobs. The Lackawanna Steel Co. and the Donner Steel Co., which were affected for a time by the strike, now have most of their men back, or have secured other men to replace those still out, and are operating their plants at nearly normal conditions. The Buffalo Union Furnace Co. and the Wickwire Steel Co. were not affected by the strike, and are now running at the same capacity as before the strike.

The Rogers-Brown Iron Co., which is located in the Lackawanna City district, where strike conditions were most virulent, is still badly affected because a large proportion of their men were controlled or intimidated by the strikers, and at present the company is operating one furnace only out of four.

Shortage at Cleveland

The calling off of the steel strike has had no effect whatever on labor conditions in the steel plants in Cleveland. The strike was over several weeks ago as far as Cleveland mills were concerned, and with the "official" ending of the strike there has not been an increase in the number of applications for work at any of the mills. There is still a shortage of common labor at the plants of the American Steel & Wire Co. and at one or two other mills located in the Newburgh district where the strikers are mostly Poles, who held out longer than the strikers in mills in other sections of the city. However, many of the Polish laborers had already returned to work and others had secured other employment so that they are not applying for their old places in the mills. Several of the Cleveland mills had a sufficient supply of common labor before the ending of the strike, there being an easing up in the labor supply in some sections of the city owing to the fact that severe weather has lessened the demand for labor for outside work, and many laborers seek inside jobs during the cold winter weather.

The General American Tank Car Corporation, Chicago, has insured all its employees who have been with the company for six months or more. The policies vary according to the length of service, the maximum amount being $1,000. The employees are not required to undergo medical examination.

ESTABLISHED 1855

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After the Steel Strike

The leaders in the steel strike declared it at an end last week, leaving the fraction of the original number of strikers who were still idle at liberty to return to work. The strike began on Sept. 22 and that it could not succeed was generally known soon after it began. A main reason for its failure was the record of its principal leader as an advocate of industrial revolution and of doctrines threatening property rights. Public opinion was strongly influenced against the strikers also by the attitude of defiance of the Government shown in the early stages of the coal strike, also by labor union advocacy of the Plumb plan for employee management of the railroads. Later came the discovery of revolutionary plots against the Government and the wholesale arrests of aliens in all parts of the country. The combination of these disturbing developments intensified the popular feeling produced by the fact that foreign workers made up in large part the unions that had been newly formed in the steel plants. Thus the whole atmosphere of the strike was calculated to array the public against the strikers and to foredoom it to failure.

Comment has been freely made in these columns on the outstanding demands made upon the steel companies by the strike leaders, representing the American Federation of Labor in its determined attempt to bring the steel industry under its control. There is no need, therefore, to go into these issues in this connection. We are rather disposed to refer to what has been said in some steel trade quarters as to the effect of the strike on the plans of employee representation under which a number of steel companies have been working for more than a year. It has been pointed out that the employees of these companies joined the strike and it has been argued, therefore, that such plans have been proved futile. The plants of the Colorado Fuel & Iron Co., which was first in the steel industry to establish conference relations with its men through employee representation, have been closed since Sept. 22, the day the strike began. The closing by the strike, of the Johnstown, Pa., plant of the Midvale Steel & Ordnance Co., which put in effect a plan of employee representation in September, 1918, has also been cited. In the same connection, by contrast, reference has been made to a large company in the Pittsburgh district which with no shop committee system and with no recognition of its employees in an organized capacity, has kept well up to normal production in all the strike period. On the other hand is the fact that apart from slight interruptions in the first days of the strike, the Bethlehem Steel Co., which is working a plan of co-operation and conciliation, has been able to operate all departments with full forces.

We refer to these varying experiences to point out that there has been some hasty and unwarranted generalization as to the labor policies which should prevail in the steel industry in view of the strike. We have looked upon the steps taken by various steel companies to cultivate better relations with their employees through conference committees, on which the employee representatives are chosen by the workers, as having great promise, and we have the same opinion in spite of what happened at these plants in the period of the strike. The steel industry, in view of its well known labor history, does not provide the soil in which the plant of conciliation can easily take root, and time must be allowed for the creation of an atmosphere in which it can flourish. Our belief is that not one of the companies which has adopted the employee representation plan will have any other intention than to go on with it, in spite of the strike.

It need hardly be said that the defeat of the steel strike leaders and the rising up of public opinion against them do not signify that there is no call for change in labor conditions in the steel industry. The extent to which the strikers were able to cripple operations is of itself a compulsion to action. The 12-hour day under present conditions of labor supply cannot be abolished at once, but there can be and should be a steady bending of effort looking to its eventual abolition. Moreover, means must be devised for a better expression of the good will the steel companies hold toward their employees. The military system that has long prevailed in the industry makes no such expression. There should be more every-day use of the very methods that in the Liberty loan campaign brought employers and men into such admirable co-operation during the war. Then the differences in social and property status were lost sight of in the recognition of a man-to-man foot-

ing. The fact that so many workers in the production of steel are of foreign birth makes all the more necessary the employment of extraordinary means by the employers to establish a relation of confidence. The problem is neither more nor less than that of realizing throughout the industry the same democracy that was urged as the goal of every united effort of managers and men during the war. We believe the employee representation plan is the best means yet devised for reaching the desired end.

The Trend in Electric Steel

The extent to which the American electric steel industry expanded in 1919, so far as new furnace installations are concerned, was a surprise. Our annual review in THE IRON AGE, Jan. 1, 1920, shows that there was a net gain of 36 furnace installations or an increase of nearly 13 per cent over 1918. The actual number of new furnaces put in operation or contracted for was 53, the difference of 17 furnaces being accounted for by a corresponding number of discontinuances or lapses, during 1919, of contracts listed on Jan. 1, 1919. So large a gain was not expected under the conditions ruling last year and especially after the striking increases due to the war in 1917 and 1918, when there were net gains of 99 and 54 furnaces respectively.

It is interesting to note the advance of the electric furnace in its application to steel castings as distinguished from ingot or special steels. Electric steel furnaces really had their start in the steel casting industry. On Jan. 1, 1915, of the 41 furnaces then credited to the American steel industry 27 furnaces or about 66 per cent were operating in steel foundries, while about 32 per cent were credited to steel ingots and alloy steels. Two years later, or on Jan. 1, 1917, there were 136 furnaces in the United States of which 45.4 per cent, were credited to steel castings and 50 per cent to ingots and special steels. This sudden advance in the use of electric furnaces apart from the steel foundry was due to the demand for war steel.

Judging by the returns of Jan. 1, 1920, electric steel castings have again assumed the major role. Of the 323 furnaces in the United States, on that date nearly 54.5 per cent are in foundries, while a little over 39 per cent are operating on ingot and special steels. Of the furnaces added last year, about 43.5 per cent were in the foundry industry. Since the war interfered with normal developments, it is likely that for some time electric steel castings will hold the predominant position.

The slowness of American steel makers to use electric furnaces in pre-melting ferromanganese is strikingly brought out in the statistics. On Jan. 1, 1915, only one furnace was performing this function. On Jan. 1, 1920, five years later, only three were in use in that capacity in the entire American steel industry. This is in marked contrast with common practice in Germany and other continental countries.

While present developments seem to show that electric steel casting makers can compete with producers using other processes, it is more than ever evident that in the alloy and special steel field the electric furnace is becoming a close competitor of the open-hearth. Its use as a duplexing unit shows continual expansion. The growing demand for alloy steels for the light weight automobile and for the airplane will add further to the prestige of American electric steel.

A Year's Price Changes

Index numbers intended to represent commodity values as a whole are being studied with unprecedented interest, but a little scrutiny of details makes it plain that one is almost certain to be misled in his conclusions if he considers index numbers merely as a whole.

There is Bradstreet's index number, which is generally regarded as trustworthy and representative of things in general. One observes that it reached a high point Aug. 1, 1918, declining more or less continuously until May 1, 1919, then advancing and declining until Dec. 1, 1919, showed the highest record of all. What is of particular interest, of course, is the movement after the war, the fair comparison being between Dec. 1, 1918, and Dec. 1, 1919. The change was from 19.0151 to 20.1756, or a net increase of 6.1 per cent.

In studying index numbers the individual may want to decide whether his income is going to have greater or less purchasing power. Or, again, he may seek light on the question whether building or construction costs are going to increase or decrease. Still another observer may be interested in the question of how real estate values are going to be affected, whether it is better to sell real estate now or wait until the reduced purchasing power of the dollar is reflected to a greater extent in an enhancement of land values expressed in dollars.

Studied in detail, the index number with its 6.1 per cent increase gives a different answer to each of the above questions. These divergences are clear when it is observed that fruits, hides and leather, textiles and naval stores show large increases while on the other hand metals, oils and chemicals and drugs show large decreases.

The individual, thinking of what his income will do, finds that he is much interested in hides and leather, particularly by way of shoes, also in fruits and in textiles. If he indulges in fruits he may not need drugs, which have decreased in cost. It is little to him that metals and oils or chemicals have gone down. Fruits have gone up 31 per cent, hides and leather 33 per cent and textiles nearly 15 per cent. The twelvemonths' movement has been very bad for the individual who is merely interested in maintaining himself.

The prospective builder, on the other hand, does not find in the commodity items that make up the index number any indication that the things he needs have gone against him. The increase in cost of naval stores does not interest him, whereas he finds that metals have gone down 21 per cent, and what Bradstreet takes as representing "building material" have advanced but 3 per cent, only half as much as the index number as a whole. Again, if one consider the cost of operating a plant or factory the large decreases in

costs of metals and oils are very encouraging.

The question of land values is very intricate, yet a little light is thrown. When fruits, hides and leather and textiles, things that the general public and particularly the wage earners are buying, have greatly advanced, while oils, metals and drugs and chemicals, which the general public does not buy to any great extent, have very materially declined, there is some light. The figures indicate that there is considerable truth in the statement that "there is an orgy of spending" on the part of the public at large. If that is the reason for the advances the reason can disappear any time—when the funds run out or the cherished ambition to own silk shirts or fancy shoes has been gratified. There is hardly an indication that people are going to offer higher prices for home sites or homes later on in the testimony furnished that they have been buying shoes and textiles so freely in the twelvemonth after the armistice. Generally speaking, the tendency of commodities involved in industrial progress, such as metals, oils and chemicals, has been downward, and that is more of a suggestion as to the future course of the dollar's value than is the advance in the commodities that are bought according to the whim of the general public.

Finally, the general observation may be made from this little study that the tendency of some writers and speakers on economics to refer everything to the dollar's purchasing power, decreased by a precise amount through inflation in currency, etc., is somewhat too strong, there being altogether too many cross currents for one to strike a general average. No one can take a pre-war or an armistice day price, apply a fixed factor to it, dependent on this fugitive "value of the dollar," and say that such and such is now the proper and correct price for that commodity. It depends on the commodity.

Lower Compensation Insurance

The Insurance Commissioner of Massachusetts, in a report recently issued, argues that the rates now charged by the underwriters for workmen's compensation insurance are too high. He points out that in Massachusetts at least (and similar rates apply elsewhere) rates could be lowered 10 per cent immediately, in spite of increasing costs to the insurance companies in wages to their employees and in overhead, and in spite of increases, by acts of legislature, in benefits to injured workers under the compensation acts. To quote briefly from the report:

> Owing to various unforeseen causes favoring the insurance companies these rates have resulted in profits larger than any rate-making board would knowingly provide for. The increase is caused by higher wages due to the war and large payments for overtime work [Premiums are based on payroll], while on the other hand there has been no proportionate increase in benefits to injured workmen, or in expenses, or in frequency or severity of accidents.
>
> This excess of premiums over losses and expenses points to the conclusion that rates should be reduced by the insurance companies in the immediate future, notwithstanding the fact that the legislature has increased weekly benefits to injured workmen in cases of total or partial disability; that the schedule and experience rating plans are now, on the average, reducing rates; and that the expenses of doing business will probably show an increase during the coming year. These factors will probably reduce the companies' gains from underwriting, but will not be of sufficient weight to overbalance the necessity of a reduction in rates.

It is apparent that compensation insurance as reckoned out by the actuaries before there was any American experience upon which to base rates was too high. Naturally the underwriters, in the beginning, were compelled to keep on the safe side, and the authorities having the rates under their control believed the figures as fair as could be had under the circumstances. Accident risk has proved to be less than what it was supposed to be, probably owing to the effects of the compensation system; it is materially less than it used to be under the old system of employers' liability. Certainly the average of serious results has diminished because of the systematized, correct and careful treatment of injuries, which has come to be almost the universal practice.

In prophesying that within the next six months there will be a countrywide reduction of compensation insurance rates, the Massachusetts Insurance Commissioner says:

> The extent of the reduction cannot be decided until there can be a more complete study of the facts from the point of view of the public and of the companies, but an average reduction of 10 per cent would seem to be not far out of the way. Compensation experience is now large enough to give a true indication of what the rates should be for our important industries if the situation is not disturbed by abnormal conditions. For those industries of lesser importance where experience is too limited to be indicative of what the rates should be, the revision should take into account the experience of analogous classes having larger payrolls.

Those larger concerns which insure themselves, as is permitted in most though not all of the States, have averaged a saving in money as compared with what the cost would have been had they insured with the companies. Their experience is of great value as a basis for true actuarial figures. Altogether the burden of workmen's compensation promises to be a decreasing one.

In view of the scarcity of ferromanganese for first half delivery, the showing made by the domestic producers in December is not encouraging. According to the blast furnace reports of THE IRON AGE, the output for that month was only 11,210 gross tons, or the smallest for any month of the year. This brings the total for 1919 to 179,079 tons or 14,923 tons per month. This is about 50 per cent of the 1918 output but it is larger than the production of any of the four years, 1912 to 1915 inclusive. Inability to obtain sufficient high grade ore is the principal reason for the declining output of alloy. Spiegeleisen production is also declining, having been only 4508 tons in December as contrasted with 5701 tons per month in the first nine months of 1919. The monthly average for 1919 is 5449 tons. This is much less than it was before the war, the 1913 production having been 10,507 tons per month. In 1918 it reached its climax at 20,775 tons per month. The

prospects for increased steel production in 1920 and the heavy foreign demand for spiegeleisen, as well as advancing prices for both ferromanganese and spiegeleisen, should stimulate the output of both alloys in the near future.

Urge Removal of Price Restrictions

WASHINGTON, Jan. 13.—Formal requests are beginning to reach the White House for removal of price and distribution restrictions applying to coke and coal. Among the organizations which have taken steps to persuade President Wilson to lift these restrictions at once, is the American Wholesale Coal Association. This association has adopted resolutions setting forth the need for a restoration of normal conditions by causing the Fuel Administration and the Railroad Administration and other Government agencies to cease at once all control over the distribution of coal and the regulation of prices. A committee has been named to push the matter.

The President's commission of three which is to investigate the wage situation growing out of the coal strike has organized by electing Henry M. Robinson as its chairman and has begun its work. It has established headquarters in the quarters formerly occupied by the Fuel Administration.

The output of beehive coke during the week ended Jan. 3 is estimated at 397,000 net tons, according to the weekly statistics of the Geological Survey. This was an increase of 74,000 tons over the previous week, when absolutely no coke was loaded on Christmas Day. Car shortage in the Connellsville region, and observation of the holiday tended to restrict the production, but it is to be noted that the output was the largest since the week of Dec. 6 and larger than that of any week from April to mid-August of last summer.

Nova Scotia Steel Co. Denies Merger

Relative to a merger of Canadian mining and steel companies, regarding which rumor has been rife for some weeks, D. H. McDougall, president Nova Scotia Steel & Coal Co., Ltd., who is at present in New York, says that nothing is being done regarding fusion of the company with other steel companies in Canada, and, moreover, the company is not at all interested in the question of a merger. Both the financial and physical condition of the properties of the Nova Scotia Steel & Coal Co., Ltd., are, he says, in such excellent condition that the company is in position to proceed independently in a most satisfactory manner. It has recently acquired the controlling interest in the Arcadia Coal Mining Co., and is now bending every effort to materially increase the production of coal from this group of mines, and is also in negotiation for considerable new machinery for its steel mills, which upon installation will increase facilities and output, enabling the company to take care of export business, as well as to meet the demands of normal domestic consumption.

Peerless Drawn Steel Co.'s Plans

The Peerless Drawn Steel Co., Massillon, Ohio, will install a bar mill to manufacture steel for its own requirements. Announcement was made last week of the sale of the plant of the Massillon Iron & Steel Co., but the name of the purchaser had not been announced at that time. The pipe foundry, formerly owned by this company, has been acquired by the Peerless company, which will use it as a bar mill building. The mill will be a 10-in., three-stand mill, with a 14-in. roughing set. It will be driven by two steam engines, the steam being furnished by the boiler plant that is provided to furnish power for the 600-kw. electric power plant of the Massillon Iron & Steel Co. This power plant will be used to operate additional equipment that will be installed by the company. In addition to acquiring the plant of the Massillon Iron & Steel Co., the Peerless Drawn Steel Co. is now erecting an addition to its plant and is also building a new office building.

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"The Iron Age" and Its Readers

Among noteworthy features of THE IRON AGE of Jan. 8 were the comments of makers of high speed steel and of metallurgists who speak with authority, on the "discovery" of a molybdenum steel of unusual properties, by Prof. John O. Arnold, of Sheffield, England. The gist of these was that so far as could be judged from the published claims Professor Arnold's steel is not new and its performance represents nothing that is unfamiliar to American makers and users.

Also in the Jan. 8 issue was an article of special value to blast furnacemen, detailing an investigation into cases of rapid destruction of stock line brick, which seemed hard to account for, but was found to be caused by carbon deposition and that in turn was due to the use of large amounts of shell turnings in the charge.

Our price charts in the Annual Review Number, Jan. 1, mark a noteworthy departure. By employing the ratio type of plotting the price, two things are achieved. One is that the rapid price advances of 1917 can be made a part of the price curves without resorting to a break in the chart or using an insert for the peaks. The other is that equal length vertical changes represent identical percentages. Thus a 10 per cent increase in price makes an upward jump in the charts of the same length for a product $10 per ton as it does for one $100 per ton; although in the one case the rise is $1 and in the other $10. In other words, parallel slopes of the curves represent equal percentage changes.

LABOR CONGRESS PROPOSED

Senator Kenyon's Plan for Adjusting Disputes—Senator Calder's Views

WASHINGTON, Jan. 13.—In spite of the failure of the first industrial conference and the criticism of the tentative suggestions of the second industrial conference, there continues to be much discussion of proposals for the working out of a program for the settlement of industrial disputes. The second industrial conference reconvened this week for the purpose of receiving suggestions for changes in its proposed plan for the establishment of a national industrial tribunal and regional boards of adjustment to adjust labor difficulties.

One of the latest suggestions comes from Senator Kenyon, of Iowa, who is chairman of the Senate Committee on Education and Labor. Senator Kenyon plans to introduce a resolution authorizing the President to call a great industrial congress of from 500 to 1000 delegates, including representatives of every form of labor and every industry in the United States. Senator Kenyon proposes that this congress shall meet as a forum for the discussion of the recommendations of the second industrial conference and as the instrument for obtaining the formal co-operation of both labor and capital in the machinery of industrial readjustment created by the conference. It is suggested by Senator Kenyon that provision be made for 100 labor members to be chosen by unions and other groups of employees; and 100 representatives of capital to include business and probably professional men. Another group may be added to represent the public. Part of Senator Kenyon's plan is that a body similar to the War Labor Board shall be set up as the executive body to carry out the principles approved by the congress and enacted into law.

Glenn E. Plumb, author of the so-called Plumb plan for the nationalization of the railroads, has extended his ideas to American industries. Mr. Plumb proposes a scheme of tripartite control for certain industries similar to the Plumb railroad plan for giving capital, labor, and the public representation in railroad management.

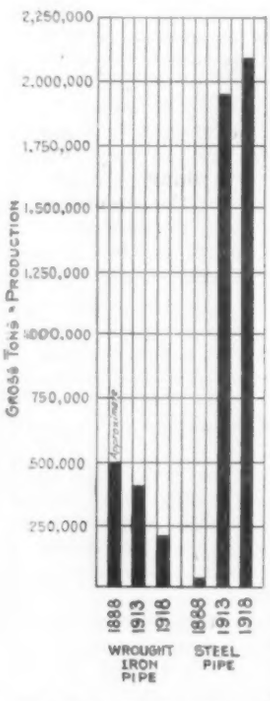
Senator Calder of New York in discussing the program of the second industrial conference has criticised some of its features.

"In reading the preliminary statement of the second industrial conference which I have done with much interest, I have been a little disappointed in failing to note provisions establishing the authority of contract and the equal responsibility of the parties," said Senator Calder. "I have noted that the statement of the conference lays stress upon the concept that leadership must be substituted for mastership but I am led to question whether the plan proposed in the statement, admirable as it may be in other respects, does not take away from the employer the element of leadership so vitally essential to increase the production of the country. If I understood the preliminary statement of the conference, it proposes, without affecting the present Federal, State, or private machinery of conciliation or adjustment, to set up a more effective series of tribunals for the settlement of disputes than at present exists, to consist of a national industrial tribunal with regional boards of inquiry and adjustment, whose findings shall have the force and effect of a trade agreement between the parties. If a finding is not made, the majority and minority reports may be published and filed. But the tribunal and its subsidiaries may inaugurate legal inquiries, with the right to subpoena witnesses, and examine them under oath, and require them to produce books and papers pertinent to the causes of dispute and to the basis of its fair adjustment. It might seem unfair to impose upon the employer the obligation of continuing to disclose his books and papers and the very good will of his business upon the complaint of possible small groups of disgruntled employees, especially without having the assurance that the decision, if ultimately reached, would be kept in spirit, or even in letter."

Changes in the Production of Steel and Wrought Iron Pipe

In a recent issue of its *Bulletin* the National Tube Co. represents graphically the changes that have taken place since 1888 in the production of steel pipe and wrought iron pipe. The accompanying diagram is reproduced from the *Bulletin* article, which is based, so far as 1913 and 1918 are concerned, on the skelp statistics of the American Iron and Steel Institute. The production of iron and steel skelp in the years 1888, 1913 and 1918 was as follows in gross tons:

	Iron Skelp	*Steel Skelp*
1913	312,746	2,189,218
1918	258,500	2,305,511



In making the diagram, allowance is made for the loss in converting skelp into pipe. The column for iron pipe in 1888 represents an estimate, as no separate statistics of skelp manufacture were gathered before 1905, when the total of iron skelp was 452,797 tons. The small black patch standing for steel pipe in 1888 is also an estimate. The first steel pipe was made in August, 1887, at Wheeling, W. Va., and 1888 therefore represents the first full year of production.

The Hammond Mfg. Co., 336 Frankfort Avenue, Cleveland, is now located at 6545 Carnegie Avenue.

Follansbee Brothers Co. Places Large Contracts

Follansbee Brothers Co., Pittsburgh, now building a new sheet mill plant at Toronto, Ohio, has placed most of the contracts for the new plant. The contract for 10 30-in. hot mills, 10 28-in. cold mills and a two-high sheet bar mill was placed with the National Roll & Foundry Co., Avonmore, Pa., while the steel buildings, taking about 3000 tons of fabricated steel, went to the Belmont Iron Works, Philadelphia. The Alliance Machine Co., Alliance, Ohio, received the contract for the cranes, which includes 14 standard electric traveling cranes, ranging from 10 to 40 tons capacity, one 50-ton ladle crane, one floor open-hearth charging crane and one ingot charging crane. The Westinghouse Electric & Mfg. Co. was given an order for one reversing mill motor of 2000-hp. capacity for driving the sheet bar mill, and two hot mill motors of 1500 hp. capacity, were placed with the Allis-Chalmers Co., Milwaukee, through the Pittsburgh office. Other contracts for smaller equipment for this plant will be placed in the near future, but a part of the equipment, including pickling machines and other smaller machinery, will likely be built by the company itself. The work of excavating for the new buildings is well under way, and this sheet plant will be rushed to completion as fast as possible.

Shipbuilder to Construct on Own Account

The Baltimore Dry Dock & Ship Building Co. announces that when present work in its lower yard at Locust Point is completed, the keels of two ships to be built by the company will be laid. This action, believed to be the first of its kind made by shipbuilders since the war, is in fulfillment of a promise made to employees several weeks ago to provide future work regardless of orders. The two vessels to be constructed by the company on its own account will be sister ships of the two 6450 ton cargo carriers recently built for the United States Shipping Board.

TIN PLATE PLANT IN INDIA

New York Engineers About to Place Contracts—Structural Steel, 3800 Tons

Perin & Marshall, New York, consulting engineers for the well-known Tata iron and steel works in India, have been advised recently of the decision of the Burmah Oil Co. to proceed at once with the building of a tin plate plant at Jamshedpur, Bengal, on a site within easy reach of the Tata plant. Perin & Marshall are consulting engineers for the new enterprise, which was projected some two years ago. The plans call for the building of a 12-mill plant and provision is made so that future extensions will bring it to four times that size. The yearly output will be about 30,000 tons of tin plate. Sheet bars will be furnished by the Tata Iron & Steel Co. The Burmah Oil Co. is a Glasgow corporation, with chief offices in London and it operates also the Persian Oil Co. Its consumption of tin plate for the manufacture of oil containers has been about 50,000 tons a year.

Bids are being asked from firms in the United States and Great Britain on the buildings, mills and equipment for the new plant. On the score of deliveries the probabilities are that the greater part of the work will be done in this country. The requirements in structural steel are about 3800 tons.

Mention in detail has been made in these columns of the extensive additions to the Tata plant that are now under way, the buildings for which require about 20,000 tons of steel work which fabricators in this country have under contract. An important development of the past year in connection with the Tata enterprise, for which Mr. Perin and his associates have been consulting engineers from the beginning, is the opening up of new sources of iron ore supply. From Amda, a point on the Bengal & Nagpur Railroad, on which the steel plant is located, a branch 65 miles long has been built to the new ore deposits at Jamda. The available addition thus provided to the Tata company's iron ore reserves is about 1,500,000,000 tons, the total, with the original Gurumaishini deposit, being now 2,000,000,000 tons. In general the ore runs about 60 per cent in iron and 0.10 in phosphorus.

Will Require 200,000 Tons of Steel

The Willys-Overland Co. expects to consume about 200,000 tons of steel of all descriptions in the manufacture of automobiles in its Toledo, Ohio, plant during 1920. This company's consumption of steel during the past year was only about 75,000 tons, being cut down materially because of a strike which started in May and as a result of which there was practically no production of cars until October.

It is announced that the Willys-Overland-Crossley Co. of England has been formed and plans have been completed for the establishment of a plant in England for the production of 25,000 Overland cars annually. A financial and working alliance has been effected with the Crossley Motor Works, Ltd. American process of manufacture will be used and American foremen will be employed in the plant at the start.

January Meeting of New York Steel Treaters

The January meeting of the New York Chapter of the American Steel Treaters Society will be held in the auditorium of the Bush Terminal Building, Forty-second Street, New York, on Wednesday evening, Jan. 21. The general subject will be carburizing. H. H. Harris, Quigley Furnace Specialty Co., New York, will read a paper on "Carburizing Equipment" and G. W. Pressell, chief chemist, E. F. Houghton & Co., Philadelphia, will discuss "Carburizing Processes." An informal dinner at Café Boulevard, Broadway and Forty-first Street, will precede the meeting.

The largest meeting of any local chapter was held by the New York Chapter on Nov. 18 when the attendance was about 450. F. B. Lounsberry, metallurgist, Atlas Crucible Steel Co., Dunkirk, N. Y., discussed the "Manufacture of Tool Steel" which was illustrated by moving pictures. At the December meeting, Dec. 17, George L. Norris, metallurgical engineer, Vanadium Co. of America, New York, addressed the meeting on "Applications of Alloy Steels." An informal dinner preceded each of these monthly sessions. A successful campaign for increased membership has been under way for several weeks.

There are now 12 local chapters of the general organization.

Wickwire-Spencer Steel Corporation Formed

The consolidation of the Clinton-Wright Wire Co., Worcester, Mass., and the Wickwire Steel Co., Buffalo, has been completed, and the corporation will be known as the Wickwire-Spencer Steel Corporation. The capitalization will consist of $7,500,000 8 per cent convertible preferred stock, and $12,500,000 7 per cent first mortgage bonds, together with 330,000 shares of common stock. T. Harry Wickwire, Jr., vice-president and treasurer of the Wickwire Steel Co., will be the president, George M. Thompson, president of the Clinton-Wright company, will be vice-president and general manager, and Ward A. Wickwire, vice-president and secretary of the Wickwire company, will be a vice-president. The common stock will be taken by present holders of the Clinton-Wright common and by the Wickwire interests, which, it is understood, will have the voting control of the corporation.

The Wickwire-Spencer Steel Corporation will be the largest wire concern in the world, after the American Steel & Wire Co. The Clinton-Wright company was organized within a year as a consolidation of the Wright Wire Co., Morgan Spring Co., and Clinton Wire Cloth Co., and afterward the Spencer Wire Co. was brought into the combination. With the Wickwire company the business will be self-contained, producing the product from the mines to the finished specialty. The merger does not include Wickwire blast furnaces, which will be operated as at present.

Acquires United States Cartridge Co.

The National Lead Co., New York, has acquired full control of the United States Cartridge Co., Lowell, Mass. In March, 1910, the National Lead Co. acquired a substantial but not a controlling interest in the cartridge company. The heirs of the late ex-Governor Butler, who founded the company, owned a majority of the stock, until the recent sale. The company is a large consumer of lead and is one of the oldest manufacturers of fixed ammunition in the country. During the World War, it employed something like 10,000. Since the signing of the armistice the number employed has been materially reduced, but the company has continued a highly important factor in the ammunition field. It will be continued as such by the National Lead Co.

The Boston District Salvage Board, 19 Portland Street, is offering for sale by negotiation the following machine tools: Two Rivett grinders, located in Brighton District, Boston; three Whitcomb & Blaisdell engine lathes, Worcester; five Garvin turret lathes, Abington; one Le Blond, one Brown & Sharpe, one Kempsmith and three Cincinnati plain milling machines, Worcester; one Gale & Sawyer and two Foster thread milling machines, Framingham; three Pratt & Whitney, three Taft-Pierce thread milling machines, Worcester; six Putnam semi-automatic milling machines, Worcester; one L. W. Pond and seven Powell planers, Watertown; four Stoll presses, Abington, two Cleveland screw and six Gridley multiple spindle screw machines, Worcester, and five Gridley single spindle screw machines, Framingham.

Edgar Allen & Co., Ltd., 718 West Lake Street, Chicago, incorporated as an American company Dec. 22, 1919, has changed its name to the Edgar Allen Steel Co., Inc., with the address the same.

Iron and Steel Markets

STEEL DEMAND VERY LARGE

Some Mills Not Heavily Sold Still Unwilling to Quote

Steel Corporation Bookings Exceptional—Price Advances of "Independents" Continue

The steel market is giving new evidence of the large volume of unsatisfied demand and of the advancing tendency in all products, in spite of the Steel Corporation's large sales at its pegged prices. The great gain of 1,137,000 tons in the corporation's unfilled orders in December is in contrast with the situation with most independent companies. Some of the latter still refrain from quoting beyond the first quarter, so that the belief that the industry as a whole is booked far ahead is in error.

The calling off of the steel strike means some improvement in labor supply, but nothing marked, as a good many workers weeks ago found other places, while not a few of the bitter-enders will fail to get back. The Bellaire, Ohio, plant of the Carnegie Steel Co., idle for nearly four months, has started up.

Because of labor shortages and short performance scarcely more than a 75 to 80 per cent operation for the majority of the industry is expected before the middle of the year. A good many plants are falling short of that just now.

The rail situation is still interesting. At Chicago 70,000 tons for the Santa Fe and 10,000 tons for the Great Western will probably be put on the books this week, and the Chicago & Eastern Illinois has reserved 10,000 tons. The Burlington has taken 5000 tons of tie plates. Canadian roads have made heavy purchases and the Soo mill on present bookings will be kept busy all year.

In equipment the New York Central has let contracts for the repair of 7500 cars involving 40,000 to 45,000 tons of plates, shapes and bars; the Gulf Refining Co. has ordered between 1200 and 1500 tank cars, taking upward of 24,000 tons of steel; the Pullman Co. will build 500 sleeping cars, requiring 12,500 tons, and the St. Paul plans building cars in its own shops at the rate of 55 a day.

Eastern plate mills have had before them in the past week no less than 250,000 tons in inquiries, 150,000 tons being for shipbuilding and the remainder largely for oil tanks and boilers.

An advance of $5 per ton in plates and shapes has been made by one Chicago interest, and Pittsburgh reports that three or four makers of tubular products are asking $10 per ton more. Sales of slabs, sheet bars and forging billets represent late advances of about $2. At Chicago about 30,000 tons of slabs have been bought by plate mills farther east at $45 to $51 per ton, subject to $4 to $5 freight.

Some motor companies have been able to pick up lots of sheet bars which they are having rolled into sheets to eke out deliveries by sheet mills. Leading automobile makers now say that the supply of sheets will be the one limiting factor in their industry in 1920.

There are some signs of the speculation in materials for export which characterized the 1917 market. Marked advances have been obtained by brokers from insistent buyers, and those who can get the material have little difficulty in finding a buyer. Japan remains active and France has bought 15,000 tons of shipbuilding material, part of which will be supplied by an exporter who bought from the United States Shipping Board. Early decision is expected on 15,000 cars for Belgium.

More cast iron pipe lettings are coming up, including 11,000 tons on which Detroit will receive bids Jan. 16. Elyria, Ohio, was in the market for 5000 to 7000 tons, but instead bought steel pipe.

Activity in the pig iron market during the week has been confined largely to basic, of which one Eastern steel company bought 50,000 tons at a price somewhat higher than recent quotations, while a consumer in the Pittsburgh district took 30,000 tons and another 5000 tons. A large Southern producer has opened its books for the first half on a basis of $40 for foundry iron and has booked 2700 tons at that high figure. An Ohio producer has sold 1000 tons of No. 2 Northern foundry at $41, furnace. Bessemer pig iron has gone up about $1.

At Cleveland the first definite inquiries for iron ore for 1920 delivery have come out, being from Virginia furnaces that in some years have used no Lake ores. However, decision on 1920 ore prices will not be made for some weeks.

There is no let-up in the upward movement of British prices, and all lines of steel generally are $2 to over $9 (in the case of galvanized sheets) higher than a week ago, with tin plates for delivery in the first half no less than $11.60 a box, figured at to-day's exchange. The protracted molders' strike is not yet settled and fresh railroad troubles in England are brewing. On 2000 tons of galvanized sheets for steel mill construction in India, British prices a month ago were below American, but sharp advances in the British market in the past fortnight will throw this business to American mills.

Pittsburgh

PITTSBURGH, Jan. 13.

The demand for pig iron, semi-finished steel and finished steel products is still keeping up—in fact, seems to be getting heavier, while on the other hand the supply of steel in any form seems to be tightening up right along, consumers and jobbers being turned down in every direction in their efforts to place orders with the mills. The leading local steel interests report they are sold up so far ahead that they are somewhat indifferent about taking more orders until they have cleaned up at least part of the obligations now on their books. Reports of 95 and 100 per cent operations of steel and finishing mills are somewhat misleading, and no doubt are giving consumers a wrong impression as to actual conditions existing. A steel plant or a finishing mill may be running to 95 per cent of normal capacity as far as number of men at work is concerned, but the chances are this same concern is not turning out more than 75 to 80 per cent of normal production. This comes about largely from inefficiency of the men, who are not putting forth their best efforts to get out

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 13, 1920	Jan. 6, 1920	Dec. 16, 1919	Jan. 14, 1919
No. 2 X, Philadelphia‡	$44.35	$44.35	$41.10	$36.15
No. 2, Valley furnace†	39.00	39.00	38.00	31.00
No. 2 Southern, Cin'ti†	**41.60**	40.60	38.60	34.60
No. 2, Birmingham, Ala.†	**38.00**	37.00	35.00	31.00
No. 2, furnace, Chicago*	40.00	40.00	40.00	31.00
Basic, del'd, eastern Pa.	**39.25**	39.00	35.00	33.90
Basic, Valley furnace	**37.00**	36.00	35.00	30.00
Bessemer, Pittsburgh	**40.40**	38.40	37.40	33.60
Malleable, Chicago*	40.50	40.50	40.50	31.50
Malleable Valley	38.00	38.00	37.00	31.50
Gray forge, Pittsburgh	38.40	38.40	36.40	30.00
L. S. charcoal, Chicago	47.50	47.50	42.50	38.85
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	48.00	48.00	48.00	43.50
O.-h. billets, Pittsburgh	48.00	48.00	48.00	43.50
O.-h. sheet bars, P'gh	50.00	50.00	50.00	47.00
Forging billets, base, P'gh	60.00	60.00	60.00	56.00
Gray forge, Pittsburgh	38.40	38.40	36.40	30.00
L. S. charcoal, Chicago	47.50	47.50	45.20	38.85
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Phila.	3.745	3.745	3.745	3.745
Iron bars, Pittsburgh	3.50	3.50	3.25	3.50
Iron bars, Chicago	3.00	3.00	2.87	3.17
Steel bars, Pittsburgh	2.75	2.75	2.75	2.70
Steel bars, New York	3.27	3.27	3.27	2.97
Tank plates, Pittsburgh	2.65	2.65	2.65	3.00
Tank plates, New York	3.02	3.02	3.02	3.27
Beams, etc., Pittsburgh	2.45	2.45	2.45	2.80
Beams, etc., New York	2.82	2.82	2.82	3.07
Skelp, grooved steel, P'gh	2.45	2.45	2.45	2.70
Skelp, sheared steel, P'gh	2.65	2.65	2.65	3.00
Steel hoops, Pittsburgh	3.25	3.25	3.25	3.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire.	Jan. 13, 1920	Jan. 6, 1920	Dec. 16, 1919	Jan. 14, 1919
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	4.35	4.35	4.35	4.70
Sheets, galv., No. 28, P'gh	5.70	5.70	5.70	6.05
Wire nails, Pittsburgh	4.50	4.50	4.50	3.50
Plain wire, Pittsburgh	3.25	3.25	3.25	3.25
Barbed wire, galv., P'gh	4.45	4.45	4.45	4.35
Tin plate, 100-lb. box, P'gh	$7.00	$7.00	$7.00	$7.35
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$36.00**	$34.50	$30.00	$26.00
Carwheels, Philadelphia	**35.00**	33.00	30.00	25.00
Heavy steel scrap, P'gh	26.00	26.00	25.00	20.00
Heavy steel scrap, Phila.	**24.50**	23.50	22.50	18.00
Heavy steel scrap, Ch'go	24.00	24.00	20.50	16.50
No. 1 cast, Pittsburgh	32.00	32.00	30.00	25.00
No. 1 cast, Phila.	**35.00**	33.00	31.00	24.00
No. 1 cast, Ch'go (net ton)	**36.50**	35.50	32.50	22.00
No. 1 RR. wrot, Phila.	**33.00**	32.00	30.00	24.00
No. 1 RR. wrot, Ch'go (net)	**25.50**	25.00	23.00	18.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.00
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	7.00
Foundry coke, future	7.00	7.00	7.00	7.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.75	*19.50*	19.25	20.50
Electrolytic copper, N. Y.	19.50	*19.25*	18.87½	20.50
Spelter, St. Louis	*9.37½*	9.50	8.25	7.25
Spelter, New York	9.85	*9.72½*	8.60	7.60
Lead, St. Louis	8.25	**8.62½**	6.90	5.50
Lead, New York	8.50	**8.87½**	7.15	5.75
Tin, New York	63.50	**65.00**	5250	71.50
Antimony (Asiatic), N. Y.	9.75	**10.25**	9.62½	7.75

maximum production, which is so badly needed. A case in point is that of a leading tin plate mill which reports 100 per cent men at work with an actual output of only slightly over 80 per cent.

The calling off of the general steel strike here last week has made very little difference in operation of manufacturing plants in the Pittsburgh district. For probably two months or more the steel interests here have had about all the men applying for work they could possibly take on, and in some cases more. The men who have not returned to work because the steel strike had not been officially declared off were largely undesirables and most of these men will not get back their old jobs. This is also largely true of the Youngstown, Ohio, district, but at Wheeling, W. Va., and Mingo Junction and Bellaire, Ohio, conditions are slightly different. At these places some plants of the National Tube Co. and the Carnegie Steel Co. were allowed to remain idle and only recently made a partial start in operations. A good many men will no doubt be taken back at these plants, and on Monday, Jan. 12, the Bellaire, Ohio, works of the Carnegie Steel Co., which had been closed since the steel strike started, was again put in operation. It is hoped that the ending of the steel strike will have some effect, at least, in improving the efficiency of labor and, if this is the case, it will lead to increased production.

Under the conditions noted above, prices could not be otherwise than very strong, and with a tendency to go higher. Three or four leading makers of tubular goods have advanced prices $10 per ton. Bessemer iron is up a dollar a ton, and there are reported sales at foundry at $40, valley furnace. Ferromanganese is also up $5 or more.

Pig Iron.—There is no falling off in inquiry for pig iron, which is very active. Consumers are now trying to cover their needs for second quarter and some for last half of this year. As a rule, furnaces are not inclined to sell for second half, but will take on some tonnage for second quarter. A local interest reports sales late last week of 15,000 tons of basic iron for delivery over first half of this year at $37, Valley furnace. Another interest has sold 30,000 tons of basic for delivery over first half, prices to be those in effect at the time shipments are made and these to be quotations on basic iron appearing in THE IRON AGE each week. We also note a sale of 1000 tons of Bessemer iron for prompt delivery at $39, Valley furnace, and there have been sales of a few hundred ton lots at $40 at furnace. The Marion Foundry & Machine Co. is in the market for 2500 tons of No. 2 foundry, but has not yet closed. Most sellers of No. 2 plain iron are quoting $40 at Valley furnace. Reports that the Carnegie Steel Co. had bought 60,000 tons of Bessemer iron are officially denied. It is a question where such an amount of Bessemer iron could be secured, unless it would be from one of the steel companies, and none of these, so far as known, has any iron to spare. Prices are firm, with indications of being higher. We quote:

Basic	$37.00
Bessemer	39.00
Gray forge	37.00
No. 2 foundry	39.00
No. 3 foundry	38.50
Malleable	38.00

Semi-Finished Steel.—On Monday, Jan. 12, the Bellaire, Ohio, works of the Carnegie Steel Co. were started up on sheet bars after being idle since September last, when the steel strike started. The Carnegie Steel Co. is now operating all its steel plants and is running to 90 per cent or better of ingot capacity.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $48 to $50; 2 x 2-in. billets at $48 to $50; slabs, $50 to $52; sheet bars, $52 to $55, and forging billets, $66 to $68 base, all f.o.b. at mill Pittsburgh or Youngstown.

Structural Material.—Local fabricators report they are figuring at present on more new work than at any time in two years and with good prospects of much of it being placed. The American Bridge Co. has taken 1700 tons for a new foundry building for Campbell, Wyant & Cannon at Muskegon, Mich., and 700 tons for an armory building in Pittsburgh. The McClintic-Marshall Co.

has taken 1500 tons of furnace bindings for the new Government armor plate plant at Charleston, W. Va., and 800 tons for a new foundry building for the Sansom Tractor Works at Janesville, Wis. We continue to quote plain material up to 15 in. at 2.45c., Pittsburgh, in large lots.

Ferroalloys.—It is very difficult to find any domestic ferromanganese for first half delivery, and most sales being made now are for second half shipment. A local interest sold last week 300 tons of 76 to 80 per cent English ferromanganese at $140 per gross ton c.i.f., Baltimore. We also note sales of 300 tons and 500 tons of domestic 76 to 80 per cent ferromanganese at $145 delivered and this price now seems to be the bottom of the market on domestic. There is some inquiry for 50 per cent ferrosilicon, but prices do not show any change.

We quote 76 to 80 per cent domestic ferromanganese $145 for second half delivered, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $80 to $85, and 18 to 22 per cent spiegeleisen at $43 to $45, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $43.75; 7 per cent, $48.00; 8 per cent, $50.00; 9 per cent, $52.00, and 10 per cent, $54.50. An advance of $3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Plates.—The shortage in supply of plates seems to be getting more acute in spite of the fact that only small orders for cars, and few of these, are being placed by the railroads. The New York Central is in the market for 2000 car bodies for the Pittsburgh & Lake Erie Railroad and not for 2000 tank cars, as reported. The Pressed Steel Car Co. is turning out 510 steel hopper cars for the Interstate Railroad and 750 tank cars for the Union Tank Line. The Standard Steel Car Co. is also working on 3500 tank cars for the same interest. The Carnegie Steel Co. and one or two other large makers of plates still quote 2.65c. to regular customers, but other mills are quoting up to 3.25c. or higher.

Sheared tank plates, ¼-in. and heavier, at 2.65c. to 3c., Pittsburgh, depending on order and delivery.

Sheets.—Leading sheet mills now report they are operating from 90 to 95 per cent of normal capacity, but actual output is probably not more than 80 to 85 per cent of normal, if that large. Labor is inefficient in many sheet mills and this is keeping down output materially. Large consumers of sheets, notably automobile builders, are still buying sheet bars in the open market, where they can find them, and having these bars rolled into sheets at so much per ton, the ultimate cost of the sheets being $10 to $20 per ton higher than the regular prices. The American Sheet & Tin Plate Co. and nearly all the leading independent mills are still quoting regular customers the March 21 schedule of prices.

We quote No. 28 gage black sheets at 4.35c.; No. 28 galvanized, 5.70c., and No. 10 blue annealed, 3.55c., these being the March 21 prices at which the bulk of the tonnage in sheets for first quarter and first half of this year has been sold.

Tin Plate.—Not much new business is being done in this industry, the output for first half of this year being under contract, nearly all mills being oversold and now putting forth their best efforts to get as much tin plate as they can for customers whose specifications are very urgent. There is some export inquiry and on this any mills that quote ask $8 to $8.50 per base box at mill. We quote tin plate for domestic consumers for first half of this year delivery at $7 per base box at mill, Pittsburgh.

Wire Rods.—There is an urgent demand for wire rods and the available supply is very limited. Local mills which have any soft rods to spare say they have no trouble in getting $60 or more at mill for all they care to sell. We quote soft Bessemer and open-hearth rods at $62 up to $65, at mill, the lower price being that of a leading interest.

Wire Products.—There is considerable agitation in the wire trade just now over the question of a new card of extras for wire nails. The mills state this is badly needed, as the present extras are not large enough to allow a fair profit and it is said this view is also shared by most of the leading jobbers. It is not unlikely that some decisive action will be taken in the near future looking to a revision in the list of extras on wire nails, most of which may advance, while possibly a few may be lowered. The demand for wire nails and plain wire for manufacturing purposes continues very heavy, with a very acute shortage in supply of both. The car shortage is delaying shipments to some extent and stocks of plain wire and wire nails all over the country are very light. Two leading local mills are now quoting $4.25 base on wire nails and $3.50 on plain wire for manufacturing purposes and have no trouble getting these prices when they have any nails or wire to sell. We quote wire nails at $3.25 to $4.25, base, and plain wire for manufacturing purposes at 3c. to 3.50c., the lower prices named being those of a leading interest.

Iron and Steel Bars.—There is an acute shortage in the supply of steel bars, two leading local mills being sold up over first quarter with considerable orders on their books for second quarter delivery, on which the price is to be fixed later. Other mills rolling steel bars are well sold up, but are quoting 2.75c. to 3c., and have no trouble getting these prices if they can make delivery.

We quote steel bars rolled from billets at 2.35c. to 3c. and from old steel rails, 3c. Pittsburgh mills rolling iron bars quote, at 3.25c. to 3.50c., Pittsburgh, plus full freight rate to point of delivery.

Hot-Rolled Strip Steel.—Makers report they are filled up on orders for regular customers for first quarter delivery, and have made considerable sales for second quarter, but with no price named for latter delivery, the price to be that in effect at time of shipment. We quote hot-rolled strips at 3.50c. to 3.75c. per lb., f.o.b. Pittsburgh, and some sales have been made at as high as 4c. at mills.

Cold-Rolled Strip Steel.—Consumers are pretty well covered for first quarter delivery, and have asked mills to reserve tonnage for them for second quarter, the price to be adjusted later. The market is very firm, and it is said practically all the orders on the books of the mills for first quarter delivery were placed at 6c. at mill. We quote cold-rolled strip steel for deep stamping and other special purposes at 6c. per lb. at mill in large lots, while up to 6.50c. is being paid for small lots.

Cold-Rolled Steel Bars.—Makers continue to report a very heavy demand for this product, especially from the automobile builders, and they are well filled up over first half of this year. We quote cold-rolled steel bars at 3.60c. to 4c. per lb., f.o.b. Pittsburgh, the higher price having been paid in some cases for small lots for fairly prompt delivery.

Nuts, Bolts and Rivets.—Makers have covered their trade over first quarter, and have taken considerable orders for second quarter delivery on which prices are to be adjusted later. Heavy orders for rivets for first quarter have been placed at $4.10 for large structural and ship rivets and $4.20 for large boiler rivets, per 100 lb., f.o.b. Pittsburgh. Discounts on nuts and bolts quoted by most makers are given on page 235.

Iron and Steel Pipe.—As intimated last week would be the case, the Jones & Laughlin Steel Co., Reading Iron Co. and Labelle Iron Works have advanced prices on oil well supplies $10 per ton. This is a natural result of the abnormal demand for oil well tubular goods that has prevailed for some months, and also of increasing costs. There is no abatement whatever in the demand for line pipe and oil well supplies, which for months has been very much beyond the capacity of the mills to supply. Every day mills are turning down orders offered them, and at considerable premiums. Three leading makers of line pipe and oil well tubular goods are not quoting, being filled up on all the product they can make over first half of this year. The National Tube Co. is practically filled for all of this year, but is taking care of regular customers as fully and promptly as it possibly can. Discounts on iron and steel pipe to jobbers, in carloads and larger lots, in effect since March 21, and still quoted by the leading company, are given on page 235.

Spikes.—Makers report demand for standard railroad spikes active and some large inquiries are in the market, but they will not likely be closed until the railroads go back to private ownership on March 1. The Chicago, Burlington & Quincy has placed 15,000 to 20,000 kegs, of which about 5000 kegs were taken by a local maker. The demand for barge and boat spikes is not so active as some time ago.

We quote standard spikes, 9/16 x 4½ in., at $3.35 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅝ in., 7/16 in. and smaller, at $4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, plus usual extras. Boat and barge spikes, $4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, f.o.b. Pittsburgh. For less than carload lots 1c. per lb. higher is asked.

Coke.—There is no betterment in supply of cars, which was only about 40 per cent of normal Monday, and one leading coke producer has just been advised that its supply of cars on Tuesday will be only 35 per cent. Blast furnaces are running short of coke, on account of slow deliveries by the railroads, and are trying to buy in the open market, but practically no prompt coke can be picked up, producers shipping their entire output against contracts. Higher prices are now being realized for furnace coke on sliding scale contracts in force, than are allowed by the Government price, which is $6 per net ton at oven. Coke producers say it will be a month or two before there is a normal supply of cars. Labor is fairly plentiful to load the limited supply of cars, but there would be a shortage if the railroads were able to furnish anything like enough cars to move the coke being made. Output of coke in the upper and lower Connellsville regions for the week ending Jan. 3 was 237,736 tons, an increase over the previous week of nearly 32,000 tons. We continue to quote $6 for spot and future furnace coke, and $7 for spot and future foundry coke, in net tons at oven.

Old Material.—The local scrap market is quiet as far as new sales to consumers are concerned, dealers who have any scrap piled in their yards being inclined to hold it for higher prices, which they fully believe will come in the near future. There is a good deal of activity in scrap in the Cleveland and Youngstown, Ohio, districts, and dealers claim they can readily sell selected heavy steel melted scrap at $27 to $28 per gross ton delivered to Youngstown consumers' mills. However, this price is fully $2 per ton higher than in Pittsburgh, several sales of heavy steel melting scrap, one of 1000 tons, having been made here last week at $25.50 per gross ton, delivered to buyer's mills. The Pittsburgh Steel Co. has shut off shipments of scrap to its mills at Monessen, Pa., having heavy stocks on hand, and also is reporting a shortage in labor to unload cars. Local dealers firmly believe that all grades of steel scrap will sell at higher prices before long, and this accounts in part for the relatively small amount of scrap that is now moving from dealers to consumers. There is a scarcity in supply of borings, and several sales of these are reported at $18 per gross ton, or higher, delivered. We quote for delivery to consumers mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy steel, Melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$26.00 to $26.50
No. 1 cast for steel plants	32.00 to 34.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	33.00 to 34.00
Compressed steel	22.00 to 23.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh district	18.00 to 19.00
Bundled steel stamping	16.50 to 17.00
No. 1 busheling	25.00 to 26.00
Railroad grate bars	24.00 to 25.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	30.00 to 31.00
Railroad malleable	26.00 to 27.00
Iron car axles	34.00 to 35.00
Locomotive axles, steel	33.00 to 34.00
Steel car axles	31.00 to 32.00
Railroad malleable	26.00 to 27.00
Cast iron wheels	33.00 to 34.00
Rolled steel wheels	27.00 to 28.00
Machine-shop turnings	15.00 to 15.50
Sheet bar crop ends (at origin)	30.00 to 30.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	25.00 to 26.00
Cast iron borings	18.00 to 19.00
No. 1 railroad wrought	27.00 to 28.00

Chicago

CHICAGO, Jan. 13.

Whereas the leading local independent has advanced plates and shapes $5 a ton, the foremost interest is accepting orders under pressure from old customers at the old prices. In some instances the additional tonnages taken by the latter are large. The New York Central, for example, has let contracts for the repair of 7500 freight cars, involving 45,000 tons of steel, the bulk of which will be furnished by the Steel Corporation.

Additional commitments with car builders account for an aggregate of 37,000 tons. Despite the Corporation's policy of holding down prices, other producers maintain that costs are mounting and that advances in finished products are necessary. About 30,000 tons of slabs, for instance, have been purchased in this district by Eastern plate mills at from $45 to $51 per ton, subject to $4 to $5 freight. In the opinion of the trade plates rolled from this material will have to command at least 3.75c., Pittsburgh, to insure a profit to the makers.

No new rail contracts have been closed, but the Santa Fé and Great Western are expected definitely to place orders this week for 70,000 and 10,000 tons respectively. The Chicago & Eastern Illinois has reserved space with the leading interest for 10,000 tons and the Western Indiana and Chicago Belt have a joint reservation for about 4000 tons. Heavy purchases of track supplies are being made to complement rail orders. The Burlington has bought 5000 tons of tie plates. That Canadian roads have purchased large tonnages of rails is indicated by the fact that the Algoma Steel Corporation has booked business which will keep its mill running for over a year. Part of these rails, it should be noted, will be rolled for American roads, notably those which have Canadian lines. A few sheet mills will be able to take additional business for second quarter delivery, if they can secure sheet bars. If they do open their books, it is doubtful whether they will sell at a price less than $5 above the Redfield prices.

Rail carbon and iron bars have advanced to 3.25c. each, Chicago mill.

Pig iron is more active, but consumers of scrap are buying less freely, the market, however, being firm and in the case of some grades higher than a week ago.

Pig Iron.—Although the market has not yet recovered the activity which characterized it before the holidays, inquiries and orders are on the increase. A large steel foundry interest with plants both in the East and the West has purchased 5000 tons of basic at $37, Valley furnace. An Ohio producer has booked 1000 tons of No. 2 Northern foundry for first half delivery at $41, furnace, subject to a freight of $3.10 to Chicago. A Michigan melter has purchased 1000 tons of malleable at $40, Valley furnace. An Illinois consumer is inquiring for 3000 to 4000 tons of foundry for delivery in the rest of the first half. A large Southern producer has opened its books for first half at $40 base, Birmingham, for 1.75 to 2.25 per cent silicon, and has already taken orders in this district for 2700 tons, one of which calls for 1000 tons of 2.75 to 3.25 per cent silicon. Another important Southern furnace which has been selling at $38, Birmingham, for first half shipment, has withdrawn from the market and a third Southern interest which sold spot foundry at $36, Birmingham, still has a limited tonnage, which it will sell at $38. The leading Northern producer is now selling in a limited way for second half shipment at the present prices. A local seller has booked orders for 500 tons of charcoal for first half delivery at $45, base furnace. Charcoal furnaces, however, are practically sold up until July, and have made some sales at as high as $48. Copper free low phosphorus is now commanding a minimum of $46.50, Southern Ohio furnace, while copper bearing material have been sold at $43, Eastern furnace. An Ohio silvery furnace has opened its books for last half at the present prices. The Bon Air Coal & Iron Corporation, Allen's Creek, Tenn., is reported to have closed negotiations for the

purchase of the Standard Iron Co. stack at Goodrich, which it will employ on coke foundry pig iron.

The following quotations are for iron delivered at consumer's yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average silicon 1.50, f.o.b. furnace, average freight to Chicago, $2.50 (other grades subject to usual differentials)	$45.00
Northern coke No. 1, sil. 2.25 to 2.75	42.25
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	40.00
Northern high phosphorus foundry	40.00
Southern coke, No. 1 foundry and No. 1 soft, silicon, 2.75 to 3.25	48.20
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	46.60
Southern foundry, silicon 1.75 to 2.25	45.00
Malleable, not over 2.25 silicon	40.50
Basic	39.00
Low phosphorus (copper free)	46.50
Silvery, 7 per cent	51.80

Ferroalloys.—The market is without features.

We quote 80 per cent ferromanganese at $140 delivered; 50 per cent ferrosilicon at $80 delivered; spiegeleisen, 18 to 22 per cent, $40 to $45 furnace.

Semi-Finished Steel.—Within the past few weeks, Eastern Plate Mills have purchased from 30,000 to 40,000 tons of slabs in this district at prices ranging from $45 a ton at shipping point of the earlier purchases to $51 a ton. These high prices for material will make it imperative for the purchasers to advance their quotations on plates materially to make a profit. In the opinion of experienced local sellers, 3.75c Pittsburgh would not be too high, taking into consideration the cost of the slabs and the added freight of from $4 to $5 a ton from producer to user.

Plates.—The leading local independent has advanced plates and shapes $5 a ton above the prices of March 21, and is applying these new quotations on the remaining small tonnages it is able to take for first half rolling. Its action, like that of the Eastern independents, was dictated by increased operating costs. The foremost interest is booked far ahead on plates, shapes and bars, but the fact must not be overlooked that it is accepting large additional tonnages under pressure from old customers at the Redfield prices. The New York Central has let contracts for the repair of 7500 freight cars, involving 40,000 to 45,000 tons of plates, shapes and bars, the bulk of which will be supplied by the leading steel producer. The Gulf Refining Co. has ordered from 1200 to 1500 tank cars from the Standard Steel Car Co., the steel for which amounting to from 24,000 to 25,000 tons of plates, shapes, bars and axles, will be furnished by the Steel Corporation. The Pullman Co. will build 500 sleeping cars involving about 12,500 tons of steel which has also been arranged for with the leading interest. This company plans to construct an average of two passenger service cars a day during the remainder of the year, and in addition, will make heavy repairs on its old equipment, which has gone through hard service in the past two years. The Chicago, Milwaukee & St. Paul has inaugurated an extensive freight car construction program in its own shops. These facilities, which it plans to operate full during the remainder of the year, have a joint capacity of 55 cars a day, making the contemplated output for the year in excess of 16,000 cars. A Western shipbuilder is in the market for 9000 tons of plates, shapes and bars. The Texas Co. is reported to have purchased 1000 tank cars from the General American Tank Car Corporation and a like number from the Pennsylvania Tank Car Co.

The mill quotation is 2.65c. to 2.90c. Pittsburgh, the freight to Chicago being being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Bars.—The leading interest is still taking orders for mild steel bars, in some cases involving considerable tonnages, but only to accommodate old customers. The ordinary buyer is paying 2.75c, Pittsburgh, and up, depending on the delivery desired. Rail carbon and bar iron mills are practically sold out for the quarter. Both of these products are quoted at a minimum of 3¼c. Chicago mills, although most of the current hard steel bar business is being closed on the basis of prices ruling at time of shipment. The railroads have bought bar iron heavily, and in the opinion of some observers, in excess of their requirements, this being accounted for by the fact inquiries were exaggerated as a precaution against a partial acceptance of orders by the mills which were known to have larger commitments. Jobbers have raised cold rolled rounds to $5.15 per 100 lb. base, and flat, square and hexagon to $5.65 base, the advance in each case being 25c. a 100-lb.

Mill prices are: Mild steel bars, 2.35c. to 3.25c. Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.25c., Chicago; rail carbon, 3.25c., mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Structural Material.—The leading fabricator is low bidder on 17,000 tons for the Chicago Union Station, but as yet the work has not been definitely awarded. All erecting shops in this district are busy with the exception of those located in this city which are still badly crippled by a strike. Recent fabricating awards include:

Balaban & Katz Theater Building, Chicago, 700 tons, to Federal Bridge Co.

Nash Motors Co., addition to machine shop, Milwaukee, 300 tons, to Northwestern Bridge & Iron Co.

Chain Belt Co., second unit of plant, Milwaukee, 250 tons, to Milwaukee Structural Steel Co.

North Avenue Bridge, Milwaukee, 200 tons, to Milwaukee Bridge Co.; also 1000 tons of reinforcing bars, to C. A. F. Turner & Company.

E. W. Bliss Co., Hastings, Mich., 170 tons, to Milwaukee Bridge Co.

Richard Wilcox Mfg. Co., Aurora, Ill., 169 tons, to Lakeside Bridge Co.

Edwards Paper Co., mill addition, Nekoosa, Wis., 110 tons, to Northwestern Bridge & Iron Co.

Current inquiries include:

Great Northern Railroad, bridge requirements, 940 tons.

Great Western Smelting & Refining Co., Chicago, 1000 tons.

Nash Motors Co., Milwaukee, two additional plant units, 800 tons.

Oliver Chilled Plow Co., South Bend, Ind., forge shop, 600 tons.

Lakey Foundry & Machine Co., foundry, Muskegon, Mich., 400 tons.

Bay City, Mich., high school, 350 tons.

Orpheum Theater, Cleveland, 350 tons, Rapp & Rapp, Chicago, architects.

Service Motor Truck Co., Wabash, Ind., 220 tons.

The mill quotation is 2.45c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote $3.47 for materials out of warehouse.

Sheets.—At a meeting of the Association of Independent Mills at Pittsburgh last week, it was found that all members were out of the market for the first quarter and a few can book additional second quarter business provided they can secure the sheet bars. Independent makers are experiencing no difficulty in selling at $5 or more above the Redfield prices, when they are willing to sell. Exporters are offering as much as $20 to $30 premium for prompt shipment. With the leading interest no longer an active factor in the market, prices are pretty well established at about $5 above the corporation's nominal quotations. The Pullman Co., Chicago, is in the market for 1100 tons of sheets. Jobbers prices have advanced.

Mill quotations are: 4.60c. for No. 28 black; 3.80c. for No. 10 blue annealed, and 5.95c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 4.82c.; No. 28 black, 6c.; No. 28 galvanized, 7.50c.

Wire Products.—The leading interest continues to take small orders to accommodate customers, but has not opened its books to the general buying public. Mill operation is steadily improving, but any gain which is made now will be wiped out when the spring demand is fully felt. For mill prices see finished iron and steel, Pittsburgh, page 235.

Rails and Track Supplies.—The Santa Fe and the Chicago Great Western are expected to close this week for 70,000 and 10,000 tons of rails, respectively. The Chicago & Eastern Illinois has reserved space for 10,000 tons with the leading interest. The Western Indiana and the Chicago Belt have a joint reservation with the same mill for about 4000 tons. The Mississippi River & Bonne Terre has drawn up a tentative contract with the Illinois Steel Co. for 500 tons. Heavy purchases of track fastenings are being made to complement the railroaders. The Burlington has bought 5000 tons of tie plates, 2000 of which will be rolled by the leading local independent and the remainder by two other mills. The Great Western has closed for part of its requirements in frogs and switches, but as yet few purchases of these track supplies have been made, although many are expected to materialize soon. Concurrent with domestic activity in rails and track fastenings is a

sustained demand for light rails from the Far East. The leading interest has booked 2,400 tons from this source, and is considering inquiries for 7000 to 8000 tons more.

Standard railroad spikes, 3.35c. Pittsburgh. Track bolts with square nuts, 4.35c. Pittsburgh. Steel tie plates and iron angle bars, 2.75c. Pittsburgh and Chicago; tie plates, iron, 3.25c. f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Cast Iron Pipe.—Detroit will receive bids on 11,000 tons Jan. 16. Elyria, Ohio, which was in the market for from 5000 to 7000 tons, has bought steel pipe. The United States Cast Iron Pipe & Foundry Co. is low bidder on 300 tons for Elyria, Ohio, and 170 tons for Rio, Wis.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $69.80; 6-in. and above, $66.80; class A and gas pipe, $2 extra.

Bolts and Nuts.—Operation is slowly improving as the result of increased deliveries of raw material by the steel mills and more efficient work by the plant employees. For mill prices, see finished iron and steel, Pittsburgh, page 235.

Jobbers quote: Structural rivets, 4.97c.; boiler rivets, 5.07c.; machine bolts up to ⅞ x 4 in., 35 and 5 per cent off; larger sizes, 25 and 5 off; carriage bolts up to ⅞ x 6 in., 30 off; larger sizes, 20 off; hot pressed nuts, square tapped and hexagon tapped, $1.45 off; coach or lag screws, gimlet points, square heads, 40 and 5 per cent off. Quantity extras are unchanged.

Old Material.—Consumers of heavy melting and shoveling steel have purchased their requirements for some time to come. Buying of all grades of scrap has fallen off, as far as users are concerned, but dealers continue to bid up prices in connection with railroad lists, while prices are firm and in some cases higher as a result of general confidence in a sustained demand. The larger lists of the week are as follows: Great Northern, 3000 tons; Wabash, 2000 tons; Northern Pacific, Soo Line and Great Western, 1000 tons each.

We quote delivery in buyer's yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron Rails	$30.00 to $31.00
Relaying rails	40.00 to 50.00
Car Wheels	36.00 to 37.00
Steel rails, rerolling	34.00 to 35.00
Steel rails, less than 3 ft.	28.50 to 29.00
Heavy melting steel	24.00 to 25.00
Frogs, switches and guards, cut apart	24.00 to 25.00
Shoveling steel	24.00 to 24.50
Low phos. heavy melting steel	27.00 to 28.00
Per Net Ton	
Iron angles and splice bars	$29.50 to $30.50
Steel angle bars	24.00 to 24.50
Iron arch bars and transoms	29.25 to 30.25
Iron car axles	34.00 to 35.00
Steel car axles	32.50 to 33.00
No. 1 busheling	20.50 to 21.50
No. 2 busheling	15.00 to 15.50
Cut forge	23.00 to 23.50
Pipes and flues	19.00 to 19.50
No. 1 railroad wrought	25.50 to 26.50
No. 2 railroad wrought	23.00 to 23.50
Steel knuckles and couplers	24.50 to 25.00
Coil springs	26.50 to 27.00
No. 1 cast	36.50 to 37.00
Boiler punchings	26.50 to 27.00
Locomotive tires, smooth	25.50 to 26.00
Machine-shop turnings	11.75 to 12.25
Cast borings	13.50 to 14.50
Stove plate	29.00 to 30.00
Grate bars	29.00 to 30.00
Brake shoes	25.50 to 26.50
Railroad malleable	28.50 to 29.50
Agricultural malleable	28.50 to 29.50
Country mixed	18.50 to 19.50

Buffalo

BUFFALO, Jan. 12.

Pig Iron.—More quoting is being done on second half iron this week than was the case a week ago, and one producer has raised its prices for that period $2 per ton for foundry grades, making them $42, $43.25 and $45 respectively for No. 2 plain, 2 X and No. 1 foundry, as against $40, $41.25 and $43 for the same grades, which were the prices it was quoting for that period last week. There appears to be no spot delivery iron left at present and only very limited tonnages of first half iron. None of the producers is pushing sales of second half output for the reason that if new freight rates go into effect it may be necessary to advance prices to cover. One producer reports aggregate sales of 15,000 tons for the week, second and third quarter deliveries, this being the producing interest that has had more unsold capacity for first half iron than any of the other furnaces of the district. It also reports inquiry on hand amounting to an aggregate of 10,000 tons, foundry grades. Some iron from Canada is being sold on this side of the border on account of the scarcity of unsold first half capacity by the furnaces of the Buffalo district. It is figured owing to the steel and coal strikes and some stacks being out of blast as a result, there was a shortage in pig iron production for the year to Jan. 1 in this district of from 150,000 to 175,000 tons. We quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$43.00 to $45.00
No. 2X, 2.25 to 2.75 silicon	41.25 to 43.25
No. 2 plain foundry, 1.75 to 2.25 sil.	40.00 to 42.00
Malleable, silicon not over 2.25	41.25
Basic	39.00
Lake superior charcoal, regular grades, f.o.b. Buffalo	42.60

Finished Iron and Steel.—There is an increasingly large volume of inquiry in practically all lines, but only a very limited tonnage to sell. The demand for sheets is tremendous not only from automobile manufacturers, but from every line that uses sheets, and prices have advanced owing to the scarcity of sheet bars. For all commodities deliveries rather than prices control the business. Prices on bar iron have advanced from $5 to $7 per ton on account of the increase in the price of scrap. There is also talk of an advance on cold-rolled steel approximating $8 per ton. Anxiety is already expressed by prospective builders as to ability to obtain supplies of reinforcing bars and structural steel sufficiently large to meet the construction program. New structural contracts awarded are as follows:

Buffalo Steel Car Co.'s plant, 400 tons, by the Jones & Laughlin Steel Co., John W. Cowper Co., general contractor.

Shops of the American Car & Foundry Co., Buffalo, 900 tons, to the Buffalo Structural Steel Co.

Addition, Lockport Paper Co., Lockport, N. Y., 200 tons, to the Kellogg Structural Steel Co.

Four-story factory, Shredded Wheat Co., Niagara Falls, N. Y., 350 tons, to the Concrete Steel Co.

Old Materials.—There is a strong demand for all grades of scrap and prices are higher in practically all lines. Dealers are holding off for further advances, so that it is difficult for consumers to buy in more than fractions of the tonnages they desire and it looks as though dealers' expectations will be verified, as the market appears to be getting stronger every day and there is a shortage to meet the demand in some grades. The price for heavy melting steel has advanced $2 to $3 per ton, and that commodity is now held at $25 to $26, Buffalo. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel, regular grades	$25.00 to $26.00
Low phosphorus, 0.04 and under	32.00 to 33.00
No. 1 railroad wrought	28.00 to 29.00
No. 1 machinery cast	31.00 to 32.00
Iron axles	40.00
Steel axles	40.00
Car wheels	33.00 to 34.00
Railroad malleable	26.00 to 27.00
Machine-shop turnings	16.50 to 17.00
Heavy axle turnings	20.50 to 21.00
Clean cast borings	20.00 to 21.00
Iron rails	28.00 to 29.00
Locomotive grate bars	24.00 to 25.00
Stove plate	24.00 to 25.00
Wrought pipe	19.00 to 20.00
No. 1 busheling	21.00 to 22.00
Bundled sheet stamping	18.00 to 19.00

Cleveland

CLEVELAND, Jan. 13.

Pig Iron.—A Cleveland interest has opened its books for the last half and has sold for that delivery two 500-ton lots of foundry pig iron at the present $40 price for 1.75 to 2.25 silicon and $41.25 for 2.25 to 2.75 silicon. This producer is not soliciting orders, but will take care of the portion of its requirements of its regular customers who want to get under cover. The market is very firm and while $40 is the ruling quotation on No. 2 foundry iron, producers claim that consumers are willing to pay $1 or $2 more for iron for early shipment. The American Steel Foundries has purchased 5000 tons of basic iron from a Cleveland interest at $37, Valley furnace, and is reported to have bought 20,000 tons in all for the second quarter delivery. An offer at the same price for a 5000-ton lot to another Cleveland producer was not accepted. There is still considerable inquiry for foundry iron for early shipment and the first half and a few inquiries are coming out for the last half. Some of the large consumers are

in the market for lots up to 1500 tons, not having covered for their full first-half requirements. An Ohio pipe foundry is inquiring for a round tonnage and a Cleveland foundry is asking for 2200 tons of No. 2 and several hundred tons of other grades, the latter inquiry being for the last half. Local furnaces have no standard foundry iron to offer for first half, but report a few sales of iron high in silicon at the regular $40 base. The shortage of iron in the Central West has caused a Detroit consumer to purchase malleable iron in eastern Pennsylvania for first quarter delivery. Bessemer iron is being offered at $40. There is considerable inquiry for Southern foundry iron for delivery during the first half and third quarter. Southern iron is being quoted at $40, furnace, for 1.75 to 2.25 silicon for the first quarter and first half for Tennessee and Alabama iron, $41.60 for 2.25 to 2.75 silicon Alabama iron and $41.25 for the same grade in Tennessee iron. Some sales have been made at these prices. A Cleveland interest has sold 6000 tons of basic pig iron to a Pittsburgh consumer; 1000 tons per month for six months, subject to prices prevailing at time of shipment. We quote, delivered Cleveland, as follows:

Basic	$37.40
Northern No. 2 foundry, silicon 1.75 to 2.25	40.40
Southern foundry, silicon 2.25 to 2.75	46.25 to 46.60
Gray forge	39.40
Ohio silvery, silicon 8 per cent	52.40
Standard low phos., Valley furnace	$43.00 to 44.00

Iron Ore.—The first definite inquiries for iron ore for 1920 delivery have come out, being from Virginia furnaces that in some years have used no Lake ore. However, sellers will withhold quotations on these inquiries until they decide on 1920 prices. Lake Erie ports received 36,874,316 gross tons of ore during the past season, or a decrease of 10,863,745 tons as compared with 1918. December receipts were 215,523 tons. The ore movement from docks to furnaces has been light since the close of navigation. Shipments for December were 638,080 tons against 1,208,815 tons in December, 1918. Bad weather and car shortage interfered somewhat with the shipments, although the demand from the furnaces for dock ore was light. Shipments from the docks to the furnaces for the season were 25,944,857 tons, as compared with 36,941,784 tons during the previous year. Stocks of ore at Lake Erie ports Jan. 1 were 10,090,708 tons, or an increase of 840,340 tons over the same date a year ago. We quote f.o.b. lower Lake ports, 1919 prices, as follows:

Old range Bessemer, $6.45; old range, non-Bessemer, $5.70; Mesaba Bessemer, $6.20; Mesaba non-Bessemer, $5.55.

Coke.—There is some inquiry for foundry coke for prompt shipment, but none is being offered. Shipments are slow and some foundries are badly in need of coke.

Bolts and Nuts.—The demand for bolts and nuts is very heavy, both in specifications, on contracts and in new business, and many manufacturers are three to four months behind on deliveries. Consumers are buying quite freely and there is a better demand from railroads than there has been for some time.

Finished Iron and Steel.—Many consumers are urging mills to accept orders for steel bars, plates and structural material that have to be turned down because of the condition of the order books. The implement trade is in the market for steel bars for the second quarter, and one interest is making first quarter contracts with that trade, shipments on which will be made in the second quarter. Many of the implement manufacturers have unfilled tonnage on 1919 contracts that will carry them until April 1 or longer. A local mill which has been selling plates at 3.25c. has withdrawn from the market, and plate sales have been made at 3.50c., which appears to represent the market for early shipments, although some tonnage has been booked at 2.75c. for more extended delivery. A Lake shipyard has taken protection on 12,000 tons of plates for four additional Lake boats that it contemplates building. One mill is selling structural material at 2.60c., but an Eastern mill has withdrawn a 2.75c. price for structural shapes. The shortage of semi-finished steel is acute, and a Cleveland consumer is negotiating with a Chicago mill for a supply of slabs. There is an inquiry from Japan for 800 tons of sheet bars. The shortage of alloy steel for the automobile trade is acute and Detroit consumers are reported to have paid premiums for this steel for prompt shipment, paying almost as much for open-hearth alloy steel as the regular price for electric furnace steel. Few mills are offering sheets, but 4.50c. is being quoted on No. 10 blue annealed sheets. Some mills have advanced spikes to 3.60c. Structural inquiries include 6500 tons for two 17-story bank buildings in Cleveland, 3500 tons for a factory building for Dodge Brothers, Detroit, and 450 tons for the National Lamp Works, for a building in St. Louis. The Rutkowski Iron Works has taken 600 tons for the Forty-sixth Street Market, Cleveland.

Jobbers quote out of stock: Steel bars, 3.27c. to 3.52c.; plates, 3.57c. to 3.82c.; structural shapes, 3.37c. to 3.62c.; bands and hoops, 3.97c. to 4.27c.; No. 10 blue annealed sheets, 4.47c. to 4.72c.; No. 28 black sheets, 5.27c. to 5.52c.; No. 28 galvanized sheets, 6.62c. to 6.87c.

Old Material.—The market is very active and prices are firm, heavy steel scrap and several other grades having further advanced. A leading Cleveland consumer, who recently came in the market for heavy melting steel, has purchased 35,000 to 40,000 tons at $24.50 and slightly lower, and has discontinued buying. Several Valley mills are in the market for heavy steel scrap at around $26. Cleveland dealers are freely offering $25.50 for this grade, and are reported to have paid as high as $27 to cover on contracts taken a few days ago at $24.50. Cast and malleable scrap are in good demand and very firm. Borings are higher, being quoted at $21.50 for delivery at Harrisburg, Pa., which is equivalent to $17.80, Cleveland. Dealers' prices delivered consumers' yards in Cleveland and vicinity are as follows:

Heavy melting steel	$25.00 to $26.00
Steel rails, under 3 ft.	30.00 to 31.00
Steel rails, rerolling	32.75 to 33.50
Iron rails	29.00 to 30.00
Iron car axles	39.00 to 40.00
Steel car axles	34.00 to 35.00
Low phosphorus melting scrap	26.00 to 26.50
Cast borings	17.50 to 18.00
Iron and steel turnings and drillings	14.50 to 15.00
Short turnings (for blast furnaces)	16.00 to 16.50
Compressed steel	21.50 to 22.25
No. 1 railroad wrought	25.00 to 26.00
Railroad malleable	30.00 to 31.00
Agricultural malleable	25.00 to 26.00
Steel axle turnings	19.00 to 20.00
Light bundled sheet scrap	16.00 to 16.50
No. 1 cast	33.50 to 34.50
No. 1 busheling	20.50 to 21.50
Drop forge flashings, 10 in. and under	21.00 to 21.50
Drop forge flashings, over 10 in.	18.50 to 19.00
Railroad grate bars	27.50 to 28.50
Stove plate	29.00 to 30.00

St. Louis

ST. LOUIS, Jan. 13.

Pig Iron.—The buying of iron continues in small lots with the aggregate limited only by the willingness of furnaces to accept orders at present prices which, by the way, are chiefly figures made on submission to the furnaces rather than quotations made by representatives. The big consumers are still, apparently, out of the market, but some of them are expected to come in as the year grows a little older and conditions become a little more settled. Prices generally are firmer and, perhaps, higher with little disposition to sell, apparently on the belief that still higher figures are to be expected. Gray iron melters are about as busy as they care to be and are watching shipments closely, some even asking for anticipations.

Coke.—Very little is being done in coke save to look after some small immediate necessities and to press shipments under contract. No new business is being shipments under contract.

Finished Iron and Steel.—In finished products the pressure for material continues heavy and mills are disinclined to accept orders, even with no delivery conditions attached to them. All railroads out of St. Louis except the Cotton Belt, which has not bought and the Frisco with heavy tonnage previously bought but not delivered, have made contracts for 1920 delivery for approximately 50,000 tons of rails, these contracts to be formally signed after the roads return to private control, except the Kansas City Terminal, which bought for January delivery. Of the total tonnage about 12,000 was taken by the Tennessee company and the rest by Chicago mills. The price stated was $47 per ton, open hearth.

Old Material.—Dealers continue optimistic and are boosting prices by their own transactions, although consumers have not yet entered the market to any great extent. The inventory period is about over and although the yards generally are fairly well filled, there is likelihood of buying unless the prices are boosted too far by the dealers. There seems to be a general impression that the material will be needed before long. Supplies are not coming in very freely, as the weather is preventing much material being picked up. We quote dealers' prices f.o.b. customers' works, St. Louis industrial district as follows:

Old iron rails	$28.50 to $29.00
Old steel rails, rerolling	32.50 to 33.00
Old steel rails, less than 3 ft.	26.50 to 27.00
Relaying rails, standard sections, subject to inspection	38.00 to 45.00
Old car wheels	31.00 to 32.00
No. railroad 1 heavy melting steel	25.00 to 25.50
Heavy shoveling steel	22.50 to 23.00
Ordinary shoveling steel	21.50 to 22.00
Frogs, switches and guards, cut apart	26.00 to 26.50
Ordinary bundled sheets	14.25 to 14.75
Heavy axle and tire turnings	18.00 to 18.50
Per Net Ton	
Iron angle bars	25.50 to 26.00
Steel angle bars	23.00 to 23.50
Iron car axles	35.50 to 36.00
Steel car axles	34.00 to 34.50
Wrought arch bars and transoms	29.00 to 29.50
No. 1 railroad wrought	24.50 to 25.00
No. 2 railroad wrought	23.50 to 24.00
Railroad springs	23.00 to 23.50
Steel couplers and knuckles	23.00 to 23.50
Locomotive tires, 42 in. and over, smooth inside	23.00 to 23.50
No. 1 dealers' forge	21.50 to 22.00
Cast iron borings	12.00 to 12.50
No. 1 busheling	22.00 to 22.50
No. 1 boiler, cut to sheets and rings	18.00 to 18.50
No. 1 railroad cast	31.00 to 31.50
Stove plate and light cast	28.00 to 28.50
Railroad malleable	24.50 to 25.00
Agricultural malleable	24.50 to 25.00
Pipes and flues	19.00 to 19.50
Heavy railroad sheet and tank	17.50 to 18.00
Railroad grate bars	26.50 to 27.50
Machine-shop turnings	13.00 to 13.50
Country mixed	20.00 to 20.50
Uncut railroad mixed	21.50 to 22.00
Horseshoes	23.00 to 23.50

Birmingham

BIRMINGHAM, ALA., Jan. 12.

Pig Iron.—At the close of the week ending Jan. 10. Birmingham iron was being sold at from $37.50 to $40, the larger portion at $38. Only one interest was asking $40. It is heavily booked into the first half and has little to offer. What it has it holds at $40. Four to five lots ranging from carload to 300 tons were booked at that figure. An interest that had been out of the market for some time reopened during the middle of the week at $38 and the offerings, around 3,000 to 4,000 tons, were immediately accepted by the southern trade. This interest then withdrew. At each advance offerings are taken in this manner. No interest is soliciting and none in a hurry to advance, but all see a $40 market. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$37.50 to $40.00
Basic	36.50 to 39.00

Coal and Coke.—There is only one price for high-grade 72-hr. foundry coke. That is $9.75, whether for spot or delivery through the year. The available supply is eagerly absorbed.

Cast Iron Pipe.—"Swamped" is a good word to apply to the cast iron pipe trade. Sanitary shops have shut down on new orders. Bookings of flange pipe for Texas oil wells are such that delivery on new orders cannot be guaranteed under six months. Prices remain firm at $63 for 4 in. and $60 for 6 in. and upwards.

Old Material.—The scrap market is enlivened by the rapid depletion of yards of dealers. Steel scrap is active and the demand for No. 1 cast is very strong. Yards are scouring the country for additional stocks in anticipation of a steady demand at good prices. We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$21.00 to $22.50
No. 1 heavy steel	20.00 to 21.00
Cast iron borings	14.00 to 15.00
Machine-shop turnings	14.00 to 15.00
Stove plate	24.00 to 25.00
No. 1 cast	26.50 to 27.50
Car wheels	26.50 to 27.50
Tramcar wheels	25.50 to 26.50
Steel axles	29.00 to 30.00
No. 1 wrought	24.00 to 25.00

Cincinnati

CINCINNATI, Jan. 13.

Inquiry for foundry iron has increased considerably the past week, most of it coming from consumers who have not yet covered for their first half needs. There is also scattered inquiry for last half, but no quotations are being made by furnaces for this delivery. This is accounted for by the uncertainty of what operating costs will be. The general expectation is that when the railroads are handed back to private ownership, they will be granted substantial freight advances, which with higher labor charges might very easily add an additional $3 to $5 a ton to the cost. Prices continue very firm, with an advancing tendency. Southern foundry silicon, 1.75 to 2.25 for prompt shipment, is now being disposed of at $38 Birmingham. One interest has sold 3500 tons at this figure during the past week. Other Southern furnaces are quoting $40 furnace Birmingham for first half and have considerable iron to dispose of at this figure. Southern Ohio furnaces are being somewhat handicapped in production by the coke shortage, but as yet none has been forced to bank, though at this moment they are operating on a hand-to-mouth basis. The little iron they have to sell for first half is being held for $40 furnace and some small sales are being made at that figure. A local dealer who has a considerable tonnage on the ground is asking $41 for prompt shipment, but as yet no sales are reported at that figure. An inquiry for 1000 tons of malleable brought a quotation of $40.50 furnace, but no sales have been reported. The coke situation, as it affects furnaces in southern Ohio particularly, is very serious. Car shortage is mainly responsible for this. One local dealer reported that his interest last week had only 10 per cent. of the normal supply, with the result that it had been forced to confine its operations to foundry coke.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, silicon 1.75 to 2.25 (base price)	$41.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	42.85
Ohio silvery, 8 per cent silicon	51.80
Southern Ohio coke, silicon 1.75 to 2.25 (No. 2)	40.80 to 41.80
Basic, Northern	38.00
Malleable	41.00

Old Material.—The scrap market is fairly active. Dealers are buying vigorously, and are inclined to hold for higher prices. One local foundry was in the market for 500 tons of machinery cast last week, but was unable to secure but a small fraction of this tonnage. Prices are very firm, with some lines advancing. This is especially true of railroad and machinery cast, both of which have been marked up $1 a ton. No large sales are being made in this territory at present, but foundry stocks are very low, and with the scarcity of pig iron foundries are expected to be very active buyers before long. One railroad interest has a list out for bids, expected to be awarded this week.

Per Gross Ton	
Bundled sheet	$15.00 to $16.00
Old iron rails	26.00 to 27.00
Relaying rails, 50 lb. and up	42.00 to 43.00
Rerolling steel rails	27.00 to 28.00
Heavy melting steel	21.00 to 22.00
Steel rails for melting	22.00 to 23.00
Old car wheels	26.00 to 27.00
No. 1 railroad wrought	23.00 to 24.00
Per Net Ton	
Cast borings	$12.50 to $13.00
Steel turnings	11.00 to 11.50
Railroad cast	29.00 to 30.00
No. 1 machinery	32.00 to 33.00
Burnt scrap	17.00 to 18.00
Iron axles	28.50 to 29.00
Locomotive tires (smooth inside)	21.50 to 22.50
Pipes and flues	16.00 to 16.50
Malleable cast	21.00 to 21.50
Railroad tank and sheet	15.00 to 15.50

Finished Material.—The demand for finished material continues heavy, and while jobbers have been getting a little better delivery they are still unable to keep pace with the demands made upon them. The sheet situation has shown no signs of improvement, and four or five months' delivery is the best the mills in this territory are able to promise. Jobbers report that they are completely out of black and galvanized, but that independent mills have offered them some tonnages at 9c. They are unwilling to pay this price, however, and are endeavoring to speed up deliveries

on their contracts. The calling off of the steel strike is expected to have a beneficial effect on the situation, as it is figured that a number of men will drift back to their old places, thus replacing green men who were pressed into service when the strike was called. This will have a tendency to increase production all along the line, but it will be some time before things are again running as smoothly as before the strike was called. We quote from jobbers' stocks:

Steel bars, 3.58c.; structural shapes, 3.68c.; No. 10 blue annealed, 4.78c.; cold-rolled rounds, 5.25c.

New York

NEW YORK, Jan. 13.

Pig Iron.—In spite of the difficulties encountered on account of the scarcity of pig iron, high prices and trouble in obtaining vessel tonnage, some exporting is being done and one sale of 3000 tons was made for export this week, while an inquiry for 5000 tons is pending. No notable tonnages are pending in the domestic market and prices show little, if any, change. Melters are pretty well covered for the remainder of the first half. The new rail and water rate of $5.30 on pig iron from Birmingham to New York is somewhat lower than the old rate, but a 60c. lighterage charge is involved and the new rate applies only to shipments over 100 tons. However, a little Alabama iron has been sold since the rate went into effect. We quote for New York delivery this year:

No. 1 foundry, silicon 2.75 to 3.25	$45.05 to $46.00
No. 2X, silicon 2.25 to 2.75	44.05 to 45.05
No. 2 plain, silicon 1.75 to 2.25	42.80 to 43.80
No. 2X, Virginia, silicon 2.25 to 2.75	44.40

Ferroalloys.—Prices of ferromanganese continue to advance. Apparently the only alloy available for delivery in the first half, except small lots from second hands for spot delivery, totals about 1500 tons. One representative of a British producer is offering 1000 tons from April on at $140, seaboard, while another is authorized to offer 500 tons for second and third quarter delivery at $150, seaboard. It is understood that small quantities of the domestic alloy are held at $175 to $180, delivered, for spot, and that one or two producers, having some lower grade alloy averaging about 70 per cent manganese, are holding this at about $150, delivered, for spot. Domestic producers are still quoting $140, delivered, for third and fourth quarters. It is understood that the Anaconda Copper Mining Co. is considering the resumption of production of electric ferromanganese, but if it is decided to do so, it will be some time before production will be under way. Two blast furnaces are expected to resume production soon, these being the Lochiel furnace at Harrisburg and that of the Miami Metals Co., Chicago. Imports of ferromanganese in November are returned at 6921 tons, bringing the total to Dec. 1, 1919, to 29,595 tons. The November imports were the largest of any month last year. The spiegeleisen market is quiet but strong at $45 to $55, furnace, one maker asking $55, furnace. The market for manganese ore is advancing and it is stated that domestic producers are willing to pay 75c. to 80c. per unit. Imports in November are reported as 11,694 tons, the largest of any month in 1919. Ferrosilicon, 50 per cent, is quoted at $80 to $90 per ton, delivered. It is understood that $80 has been slightly shaded on a recent transaction, but this is unconfirmed. Demand is normal.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 3.27c.; shapes, 2.72c. to 2.82c.; plates, 2.92c. to 3.77c., the minimum prices being for indefinite delivery and the higher prices for the first quarter; bar iron, flats, wider than 6 in., 4.07c.; ⅜ and 7/16 in. round and square, 4.47c.; light rounds, squares and flats, 4.77c., and other sizes, 3.77c.

Finished Iron and Steel.—Continued scarcity and rising prices of steel products are noted. A shipbuilding company needing 18,000 tons of ship plates is reported to have offered to pay 3.25c., Pittsburgh, for a quantity held by an exporter, but without success. An Eastern plate mill has quoted 4c., Pittsburgh, on 1000 tons of tank steel on which the fabricator asked for 30 days protection. The plates are to be fabricated into tanks for shipment to Mexican oil fields. Another Eastern mill names a price of 4c. on plates, but is unable to take any orders at present. It is difficult to find a mill in a position to make delivery of sheared plates in first quarter, but universal plates can be had in two to four weeks time. One mill with 2000 tons of unsold sheared plates for first quarter is quoting 3.50c., Pittsburgh, on sheared, and 3c., Pittsburgh, on universals. Other makers are quoting 3.50c. on sheared plates, but are unable to make delivery before second quarter. Japan has bought plates at 3.25c. As a further commentary on the unusual price situation, mention may be made that one of the large steel companies is about to take business on sparingly for the second quarter at 2.90c. for bars, 3c. to 3.10c. for shapes and 3c. to 3.25c. for plates. With private operation of the railroads only six weeks off, comparatively little inquiry for locomotives and cars has been received. Locomotive building plants on the whole are working only 50 to 60 per cent of capacity. Car shops are busier and anticipate a good demand for steel car bodies. One inquiry of this kind from the New York Central calls for bids on 1000 to 1500 hopper-type car bodies for the Pittsburgh & Lake Erie Railroad. About 10,000 to 15,000 tons of steel will be required. About 150,000 tons of rails has been bought for Eastern railroads for delivery as early as the mills can make them. The volume of fabricated steel business appears to have dropped off from December, which incidentally is expected to show a total for the month close to the November figure. The largest new inquiry is 3800 tons for the Burmah Oil Co., and the largest item locally is 400 tons for an addition to the Bowling Green Building. The Virginia Bridge & Iron Co. has been awarded the contract for an office building for the Magnolia Petroleum Co., Dallas, Tex., 4000 tons, and the American Bridge Co. will erect the 1500 tons addition for the Evening *Bulletin*, Philadelphia. The market for semi-finished steel is very strong and few mills are willing to make sales at any price. About 1300 tons of off billets were sold by a mill at $46, Pittsburgh, and a resale of 1000 tons of standard open-hearth re-rolling billets was made by the same mill for a customer at $58.50, Pittsburgh.

Warehouse Business.—Pressure from manufacturers for all kinds of warehouse stocks is becoming stronger. Large interests, including some makers of electrical, elevating and plant equipment, have placed comprehensive lists before jobbers for a variety of steel, some lists amounting to 500 to 1000 tons. One large warehousing company reports December orders equal to banner war months, and January trade is generally expected to equal the past month. With depleted stocks and mill shipments dragging, jobbers are at a loss to handle the quantity of business offered. Shafting and screw stock are keenly sought and demand has forced a general advance in effect Jan. 12 from 5c. per lb. on rounds and 5.50c. on squares, flats and hexagons to 5.15c. and 5.65c. respectively. One other large seller announces corresponding advances, effective Jan. 15, to 5.25c. and 5.75c. Cold-rolled strip steel is quoted at 9c. to 10c., and higher prices are anticipated as a result of unremitting demand. Some jobbers have advanced minimum prices on blue annealed sheets to 5.75c. for No. 10, box annealed black sheets to 7c. for 28 gage. Spot delivery in some cases tends to bring higher quotations. Quotations on spring steel are from 5.50c. to 6c., with a steady stiffening toward the 6c. level. We quote out-of-store prices as follows: Steel bars, 3.52c. to 4c.; structural shapes, 3.47c. to 3.75c.; plates, 3.67c. to 4c.; No. 10 blue annealed sheets, 5.07c. to 5.80c.; 28-gage black sheets, 6.50c. to 7.00c.; 28-gage galvanized sheets, 7.75c. to 9c.

Cast-Iron Pipe.—Business is rather quiet, though satisfactory. The recently raised prices are generally accepted without dickering, consumers realizing the mounting costs of raw material. Chief demand comes from water and gas pipe users. There are a few inquiries for export, but little business results from them. We quote 6-in. and heavier at $67.30, New York; 4-in., $70.30, with $2 additional for Class A and gas pipe.

Old Material.—The market is clearly rising again, due to brisk demand, scarce supplies and the rising prices of pig iron. Heavy melting steel, which has

remained inactive as to price change for three weeks, has this week advanced about $1. The price of cast scrap is difficult to gage because of the extreme scarcity and the willingness of consumers to pay nearly whatever is asked. Much scrap is being shipped West, where the scarcity appears to be even more marked. The only damper to such Western shipping is the difficulty of securing railroad permits. A New York broker has raised buying prices over a week ago on an average of 75c. on 18 items. Prices which brokers and dealers are paying per gross ton, New York, follow:

Heavy melting steel	$20.50 to $21.00
Rerolling rails	30.00 to 31.00
Relaying rails, nominal	47.00 to 48.00
Steel car axles	33.00 to 34.00
Iron car axles	42.50 to 43.00
No. 1 railroad wrought	29.00 to 29.50
Wrought iron track	22.00 to 23.00
Forge fire	15.50 to 16.00
No. 1 yard wrought, long	23.00 to 24.00
Light iron	7.00 to 8.00
Cast borings (clean)	17.00 to 17.50
Machine-shop turnings	15.00 to 15.50
Mixed borings and turnings	14.50 to 15.00
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	19.00 to 19.50
Stove plate	22.00 to 23.00
Locomotive grate bars	25.00 to 26.00
Malleable cast (railroad)	24.00 to 24.50
Old carwheels	34.00 to 35.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$35.00 to $36.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	34.00 to 35.00
No. 1 heavy cast, not cupola size	25.00 to 26.00
No. 2 cast (radiators, cast boilers, etc.)	25.00 to 26.00

Philadelphia

PHILADELPHIA, Jan. 13.

The principal transaction in this market in the past week was the purchase of about 50,000 tons of basic pig iron by an Eastern consumer at prices ranging from $39.25 to $40, delivered. The situation as to foundry iron is somewhat easier, shipments going forward at a much better rate than in December. Many consumers are pretty well covered for first half and there is not the demand that existed a few weeks ago for prompt shipment iron. Prices are no lower, but some sellers believe the peak has about been reached.

In the steel market comparatively little is being done owing to the unwillingness of steel companies to make further commitments until tonnages on their books have been partially worked off. Production is not increasing very rapidly, which leads some in the trade to believe that it will be the middle of the year before there is any appreciable easing of the situation. England has come into the market for fair-sized tonnages of semi-finished steel, particularly billets and wire rods, but exporters find it almost impossible to fill such orders. Plate inquiries are numerous and call for fairly large tonnages, one from a shipyard calling for 12,000 tons for a battleship. A steel company in the past 30 days has turned down inquiries for an aggregate of about 250,000 tons of plates. Railroads have begun to inquire for plates in lots of 1000 tons or less.

The scrap market is more active and prices are up from $1 to $2 a ton on some grades.

Pig Iron.—An Eastern consumer has bought about 50,000 tons of basic pig iron for shipment in March and second quarter, the prices paid ranging from $39.25 to $40, delivered eastern Pennsylvania. The business was divided among four furnaces. Small lots of basic iron have been sold at as high as $42. The demand for foundry iron for prompt shipment is not so large as a few weeks ago, and the situation is distinctly easier. One or two sellers with iron to dispose of have not found consumers as ready to pay the prices asked as they were only two or three weeks ago. A canvass of the trade by one seller disclosed that a great many consumers are pretty well covered for first quarter, and in a majority of cases even for the entire first half. While prices for foundry iron have gone no higher, the tone is firm. Some sellers believe the peak of prices has been reached, while others freely predict $50 quotations. A consumer has bought a fair-sized tonnage of gray forge iron at $40, furnace. Malleable has been sold at $44.50 to $45.25, delivered. Standard low phosphorus iron has been sold in the past week at $49, furnace, and makers of copper bearing iron are holding for $45, furnace. The Pulaski Iron Co. is again in the market with limited tonnages for delivery beginning in March. The Lavino Furnace Co. will blow in Sheridan furnace on foundry iron the last of this month. The Alan Wood Iron & Steel Co. has lighted for the first time its new blast furnace, which has a daily capacity of 600 tons of basic iron. Shipments of foundry iron are going forward much more freely this month than in December. One large consumer has received so much iron on contract so far this month that it asked the furnace to suspend shipments temporarily. The surplus property division of the Ordnance Department, 1710 Market Street, Philadelphia, has sold about 1750 tons of surplus basic pig iron at $38, f.o.b. shipping point. About 1500 tons of the iron was at New Castle, Del., and the remainder at New Haven, Conn., at the plants of the Penn Seaboard Steel Corporation. The buyer was the American Metals Co., Philadelphia.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Penn., No. 2X, 2.25 to 2.75 sil.	$44.35 to $45.05
Eastern Penn., No. 2 plain, 1.75 to 2.25 sil.	43.10 to 43.80
Virginia No. 2 X, 2.25 to 2.75 sil.	45.35
Virginia No. 2 plain, 1.75 to 2.25 sil.	44.10
Basic deliv. Easton, Pa.	39.00 to 40.00
Gray forge	39.40
Standard low phosphorus (f.o.b. furnace)	48.00
Malleable	42.00 to 43.00
Copper bearing low phosphorus (f.o.b. furnace)	40.00 to 41.00

Ferroalloys.—Very little, if any, ferromanganese, either domestic or foreign product, is now available for first half shipment. Domestic makers have taken a little business for second half at the prevailing price, $140, delivered. The British price has been raised by some agents to $140, seaboard, but only second half shipment is obtainable. Spiegeleisen is said to be obtainable at $45, furnace, but the supply of this alloy for first half has also been pretty well sold.

Semi-Finished Steel.—The demand for semi-finished steel exceeds the supply. Sheet mills would like to buy sheet bars and have inquired in this market without apparent success. Sales of 4 x 4-in. open-hearth rerolling billets have been made at $59, Philadelphia, and forging billets, in one or two lots of about 1500 tons, have recently brought $69 and $71.50, Philadelphia. Slabs have been sold at $2.50 a ton above the price of rerolling billets. An Eastern subsidiary of the Steel Corporation has tried to buy billets in this market, offering as high as $55, Pittsburgh. England is trying to buy billets and wire rods.

Plates.—Within the past 30 days an Eastern mill has turned down inquiries calling for a total of about 250,000 tons of plates. Of this, about 150,000 tons was for ships and the remaining 100,000 tons was largely for boilers and oil tanks. Makers of oil tanks are very eager to get tonnages on the books of the mills. The demand from all sources for light plates is exceedingly heavy. One company asserts it could fill up its mills for a year on ⅛-in. and 3/16-in. tank steel. Sheared plates are almost unobtainable for first quarter shipment, and quotations for second quarter or at mill convenience range from 3.50c. to 4c., Pittsburgh, the latter price having been quoted principally on undesirable tonnages. Two or three sellers have no price at all; in other words, they do not desire to quote for any delivery or for any amount. One inquiry before the trade is for 12,000 tons of plates for a battleship. The inquiry comes from a shipbuilder, not from the Navy Department. A shipbuilding interest which has been in the market for 20,000 tons of plates has not placed the order, so far as reported. We quote sheared plates, ¼ in. and heavier, at 3.745c., Philadelphia.

Structural Material.—Prices quoted range from 2.55c. to 2.75c., Pittsburgh, but it is becoming more difficult to obtain shipment in the first quarter. One or two mills are entirely out of the market for any delivery.

Sheets.—An Eastern mill has advanced its price on blue annealed sheets to 4.30c., Pittsburgh, for No. 10 gage. Orders for second quarter shipment have been taken on this basis.

Bars.—The prevailing quotations for bars are 3c. to 3.75c., Pittsburgh, but very little is to be had for specified delivery. Resale lots and bars from some of the re-rolling mills are bringing higher than these prices. Bar iron is still quoted by the leading makers at 3.50c., Pittsburgh, and orders are being received at a good rate.

Old Material.—On greater buying activity, prices of all grades of old material have advanced. An Eastern consumer has bought between 5000 and 10,000 tons of heavy melting steel in the past few days at $24.50 and $25, delivered. Large sales in the Pittsburgh district at around $27.50, delivered, have also stimulated demand for heavy steel in this market. Carwheels, No. 1 railroad wrought, No. 1 cast and stove plate are up from $1 to $2 a ton. The market is very firm and dealers predict still higher prices. They call attention to the disparity of about $15 a ton between basic pig iron and heavy melting steel, a difference, it is stated, which cannot long continue. We quote for delivery at consumers' works in eastern Pennsylvania as follows:

No. 1 heavy melting steel	$24.50 to $25.00
Steel rails rerolling	33.00 to 35.00
No. 1 low phosphorus, heavy, 0.04 and under	30.00 to 32.00
Car wheels	35.00 to 36.00
No. 1 railroad wrought	33.00 to 34.00
No. 1 yard wrought	27.50 to 28.50
No. 1 forge fire	19.00 to 19.50
Bundled skeleton	19.00 to 19.50
No. 1 busheling	22.00 to 23.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	18.50 to 19.00
Mixed borings and turnings (for blast furnace use)	17.00 to 17.50
Machine-shop turnings (for rolling mill and steel works use)	18.50 to 19.50
Heavy axle turnings (or equivalent)	20.00 to 21.00
Cast borings (for rolling mills)	23.00 to 24.00
Cast borings (for chemical plant use)	25.00 to 27.00
No. 1 cast	35.00 to 37.00
Railroad grate bars	26.00 to 27.00
Stove plate	26.00 to 27.00
Railroad malleable	27.00 to 28.00
Wrought iron and soft steel pipes and tubes (new specifications)	22.50 to 23.50
Iron car axles	45.00 to 46.00
Steel car axles (f.a.s. New York for export)	39.00 to 40.00

Boston

BOSTON, Jan. 13.

Finished Iron and Steel.—A further tightening up in orders booked by local mill representatives for finished iron and steel is noted this week. Bars, as quoted here, range from 2.35c to 3.00c f. o. b. Pittsburgh, but few are obtainable at any price. The Walworth Mfg. Co., Boston, has bought 300 tons wrench stock at 2.35c f. o. b. Pittsburgh, first half delivery, but has been unable to place an additional 500 tons. All sizes of concrete bars are especially short. Orders for several thousand tons have been turned down by mill representatives since last reports, notwithstanding offers of 5c and 6c f. o. b. Pittsburgh by consumers. The New Haven Railroad is in the market for 25,000 tons of rails and the Maine Central for 8,300 tons. There is a big demand for sheets, but few are obtainable. The Draper Corporation, Hopedale, Mass., has not covered its sheet requirements. The market here on plates, large tonnages, is on a 3.00c. to 3.25c. f. o. b. Pittsburgh base, but as high as 4c. has been paid for special small lots. Bids will be received until Jan. 20, by the Bethlehem Shipbuilding Corporation, Ltd., on 11,500 tons medium tank steel plates and 1,200 tons high tensile for the battleship Massachusetts. Delivery dates are uncertain. The Boston & Maine Railroad has bought an additional 500 tons of plates for car repair work. That road and the New Haven have covered their first quarter requirements. The Groton Iron Works, Groton, Conn., is still in the market for 8,000 tons of plates. Structural prices take a wide range here and in all instances are exceptionally strong.

Pig Iron.—The outstanding features of the market during the past week have been the activity of Virginia iron, the strength of Alabama, and the inactivity of Pennsylvania and Buffalo. The bulk of business, which amounts to several thousands tons, was confined to two or three houses. The General Electric Co. has covered its requirements and the Sessions Foundry, Bristol, Conn., bought its supplies. The Draper Co., Hopedale, Mass., has made inquiries for several hundred tons last half iron, but there are no other large prospective orders. All Virginia sales reported, a majority of them in 200 ton lots, are on a $40 furnace base, first half delivery. It is reported here that the Virginia Iron, Coal & Coke Co. will open its last half books within a week. A limited amount of high silicon Pulaski iron, March, April, May and June delivery, is offered, at the option of the furnace, on a $40.25 base. For instance silicon 2.75 to 3.25 is offered at $43.25 furnace, and silicon 3.25 to 3.75 at $45.25. Alabama iron sold here early in the week on a $38 furnace base. To-day the market is strong on a $40 base, second quarter delivery, with 4 per cent. differentials. Included in the sales is one of 500 tons silicon 2.75 to 3.25, second quarter delivery, at $43.30 furnace, to a Massachusetts consumer. It is reported that one Buffalo company is offering second half iron here at $40 furnace, but the story cannot be substantiated. Offers to buy Buffalo resale silicon 2.25 to 2.75 at $43 furnace have been turned down by a nearby foundry. The foundry bought the iron at less than $30 furnace. Pennsylvania furnaces have solicited second half business, on a delivered basis of about $45, with little success.

Eastern Pa., No. 2X, sil. 2.25 to 2.75	$46.15
Eastern Pa., No. 2 plain, silicon 1.75 to 2.25	44.90
Buffalo, No. 2X, silicon 2.25 to 2.75	46.15
Buffalo, No. 2 plain, silicon 1.75 to 2.25	44.90
Virginia No. 2X, silicon 2.25 to 2.75	$45.95 to 46.95
Virginia, No. 2 plain, silicon 1.75 to 2.25	44.70 to 45.70
*Alabama, No. 2X, sil. 2.25 to 2.75	45.25 to 47.35
*Alabama, No. 2 plain, silicon 1.75 to 2.25	43.75 to 45.75

*F.o.b. alongside Boston.

Cast Iron Pipe.—The cast iron pipe supply situation throughout New England is growing more serious. There is an urgent need of ¾ to 2-in. pipe, and liberal premiums offered by consumers have not resulted in bookings. The local mill representatives hold out little encouragement as to when they can reopen their books.

Old Material.—Numerous car-lots of machinery cast have been sold to New England foundry interests during the past week, the demand being excellent. Because of this buying and a shortening up in offerings the market is considerably stronger. No. 2 cast also has sold well and is stronger, and a number of sales of mixed No. 1 and No. 2 at $35.50 delivered are reported. Some dealers are holding out for $36 delivered on mixed cast, but no sales at that price have been made. Stove manufacturers are buying stove plate, which is scarce, and the market is firmer. One large consumers is offering to take any tonnage of stove plate at $25 delivered, but most dealers want $27.50. Chemical interests, rolling mills and steel plants have been active buyers of cast iron borings and have been willing to pay slightly higher prices for them.

No. 1 heavy melting steel	$17.50 to $18.50
No. 1 railroad wrought	25.50 to 26.50
No. 1 yard wrought	21.00 to 22.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	17.00 to 18.00
Machine-shop turnings	13.00 to 13.50
Cast iron borings	16.50 to 17.50
Heavy axle turnings	15.50 to 16.00
Blast furnace borings and turnings	12.50 to 13.50
Forge scrap	13.50 to 14.50
Bundled skeleton	13.50 to 14.50
Steel car axles	27.00 to 28.00
Car wheels	28.00 to 29.00
Machinery cast	32.50 to 33.50
No. 2 cast	30.00 to 31.00
Stove plate	22.50 to 23.50
Railroad malleable	22.00 to 23.00
Rerolling rails	27.00 to 28.00

San Francisco

SAN FRANCISCO, Jan. 6.

Rumors are rife of a settlement of the mechanics' strike in the bay district to be effected in the immediate future. The union officials say that eight large shops have already signed the union scale, but they decline to give their names and those best informed in the trade, including the secretary of the Metal Trade Association, deny that any machine shop of importance has withdrawn from the fight.

Bars.—Bars continue in excellent demand and the mills are booking orders for delivery in March-April and April-May, and are also limiting the amount even of their future deliveries. Not only is the domestic demand good, but the demand for export shows a constant increase.

Pipe.—There is no change in the scarcity of wrought pipe in this market. Local representatives of Eastern mills say that deliveries are showing no improvement, while the inquiries show a constant increase. The demand in the old fields is especially heavy. The falling off in the demand for cast iron pipe was short lived and it is stated that business prospects were never better. The town of Whittier received bids this week for 2000 tons running in diameter from 4 in. to 24 in.

Pig Iron.—The price of pig in this market is always quoted f.o.b. furnace. To this price the freight to Pacific common points must be added. Just before the furnace price advanced to $40, a sale of No. 3 foundry was made at $35 f.o.b. furnace and the purchaser paid $16.80 freight in addition. This made the San Francisco price on this shipment $51.80. During the past week, 1000 tons of Scotch pig were purchased by local foundries through a broker at $56.50 a long ton delivered in San Francisco. While the freight charges and route of shipment are not stated, this price is not far from the price of $40 f.o.b. furnace plus freight.

Coke.—Coke comes into this market from a number of sources and its price is made up of the quotations at the point of production plus the freight. While the bulk of the coke comes here from the Pennsylvania and Alabama fields, considerable comes in from Colorado and New Mexico. Coke also reaches here from time to time from Seattle and British Columbia and even from Wales. Recent sales of Eastern coke were made at $23.60 per long ton f.o.b. San Francisco and some shipments coming from Colorado sold for $18.50 per long ton f.o.b. San Francisco.

Structurals.—The most important of the recent contracts for structural steel was an award made by the Los Angeles flood control district board. Six hundred tons for a railroad bridge was awarded to the McClintic-Marshall Co. Two hundred and fifty tons for a highway bridge was awarded to Chas. W. Beverstock, Los Angeles.

Old Materials.—Cast iron car wheels are in big demand for export, and recent shipments were made to the Orient. There is also considerable demand in the Orient for ship plate shearings. There is practically no scrap coming in from the country on account of recent rains. The demand for cast iron scrap is strong, but none is offered.

Still Higher British Prices

Molders' Strike Unsettled — America Seeking Black Sheets—All Forms of Steel Generally Advanced

(*By Cable*)

LONDON, ENGLAND, Jan. 12.

The ballot of the striking molders has been largely adverse to a resumption of work. Fresh railroad troubles are brewing and congestion is unrelieved. The quarterly meeting at Birmingham reveals a very strong position, with makers reluctant sellers. Official export prices of Cleveland makers of pig iron, referred to in our cable last week as 180s. for No. 3 and inferior grades and as 187s. 6d. for No. 1 pig iron, apply only to France, Italy and Belgium. Other markets are unrestricted and for these the export price of foundry iron is around £10 to £11, with not nearly enough iron to satisfy demand.

The tin plate market is panicky, demands being heavy and unsatisfied, and merchants attempting to buy large supplies on options. Works are mostly sold out and for the first half up to 62s. is asked with about 59s. for July-September delivery. The advance in tin and steel are the predominant causes for these increases. Galvanized sheets are strong at about £48, with large makers still holding off.

America is inquiring for black steel sheets, mostly large sizes, for quick shipment, to keep mills going, but these are probably unobtainable.

Steel makers have revised their prices for the home trade. These cover ship plates, boiler plates, tees, channels, beams, round bars, rails, billets and hoops, the advances being shown in the table below, if compared with the prices quoted a week ago. In each case export prices are higher and subject to negotiation.

Guest, Keen & Nettlefolds, Ltd., Birmingham, has purchased control of John Lysaght, Ltd., Bristol.

We quote per gross ton, except when otherwise stated, f.o.b. makers' works, with American equivalents figured at $3.74 for £1, as follows:

	£	s.	d.	£	s.	d.	
Ship plates	22	10	0 to 24	10	0		$84.15 to $91.63
Boiler plates	26	10	0 to 29	0	0		99.11 to 108.46
Tees	20	10	0 to 22	0	0		76.67 to 82.28
Channels	19	15	0 to 21	5	0		73.86 to 79.47
Beams	19	10	0 to 21	0	0		72.93 to 78.54
Round bars, ¾ to 3 in.	22	0	0 to 24	0	0		82.28 to 89.76
Rails, 60-lb. and up	18	15	0 to 19	5	0		70.12 to 71.99
Billets	17	10	0 to 18	0	0		65.45 to 67.32
Sheet bars	17	0	0 to 18	0	0		63.58 to 67.32
Steel hoops	26	15	0 to 27	0	0		100.04 to 100.98
Tin plates	0	59	0 to 0	62	0		11.03 to 11.59
Galv. sheets, 24 g.	48	0	0				179.52

Prof. Arnold's Molybdenum Steel—Railroad Rate Advance Likely 50 Per Cent—American Sheffield Business Increasing

LONDON, ENGLAND, Dec. 22, 1919.—The iron and steel trade is still considerably hampered by the railroad situation where congestion and shortage of cars are seriously hindering the movement of raw and finished materials. A deputation waited upon the prime minister some days ago as to the question of transport congestion in South Wales. It was composed of representatives of traders, trade unions and the railroad and dock companies. It pointed out the serious position that had arisen through railroad delays and dock congestion. The efficiency of the public service, it was stated, was impaired 50 per cent, at least, and in some cases 75 or 80 per cent. The prime minister's reply amounted to a promise of co-operation between the government and representatives of the South Wales interests. At the same time Lloyd George compared the position of South Wales with that of other districts, and pointed out that South Wales appeared to be fairly well off. He further stated that all over the country there was a dearth of railroad stock and the lack of capacity for repairs was serious.

In this connection it is interesting to note that it is intended to start locomotive making at Woolwich Arsenal. It appears that an order for 100 locomotives was placed in November at the arsenal, all for use on the railroads of this country. It is still necessary to put the plant in condition to turn out such work.

Considerable interest has been attracted by the statement in the daily non-technical press in regard to the discovery of a new steel. This appears to have arisen from the statement by Dr. J. O. Arnold, formerly professor of metallurgy, University of Sheffield, that he had discovered a new steel in which 6 per cent of molybdenum is substituted for 18 per cent of tungsten, the patent for which was blocked by the governmental department which during the war prevented him from proceeding with the matter. The discovery was described in a paper on "The Molecular Constitutions of High Speed Tool Steels and Other Correlations with Lathe Efficiencies," which Dr. Arnold read before the Iron and Steel Institute last May. It is stated that Dr. Arnold's discovery followed up his previous invention of vanadium steel, which contains roughly 6 per cent of carbon, 18 per cent of tungsten and about 3.50 per cent of chromium. For the tungsten Dr. Arnold substituted 6 per cent of molybdenum. A leading steel-

maker is reported to have stated that everything now depended on the reliability of the steel. The great possibilities of the steel are admitted.

Since this matter first appeared in the press an important development has occurred. It seems that the patenting of the steel had never got beyond the provisional stage, but on Dec. 19 Dr. Arnold received notice from the government that the embargo they had placed on the discovery had been removed.

It is reported that Sheffield trade with the United States is increasing considerably. In November it reached a value of £82,000 compared with an average in 1913 of £55,000 per month. From the signing of the armistice to the end of October the average was £40,000 per month. The growth is due in a large degree to the demand for Sheffield special steel, including high-speed tool steel.

A new company has been registered with a capital of £200,000 known as the Eastern Light Castings Co. for the purpose of carrying on in the United Kingdom, India, Burmah and elsewhere the business of founders in brass and other metals, engineers and manufacturers of all kinds of light and heavy castings, forgings, stoves, etc. The subscribers are A. W. Steven, Lauriesston Iron Works, Falkirk; T. M. Waugh, Grange Iron Works, Falkirk; J. Brown, Sunnyside Iron Works, Falkirk; J. Cameron, South Bank Works, Kirkintilloch, Scotland. These gentlemen will also be the first directors, together with W. T. Maclellan.

It is now stated semi-officially that the rise in railroad rates on raw material will be 50 per cent from Jan. 15. If this proves correct, it will mean a rise of 5s. 2½d. per ton in the cost of Cleveland pig iron. At the moment prices are unaltered at 167s. 6d. for No. 1 and 160s. for No. 3 Cleveland g.m.b., No. 4 foundry and No. 4 forge. For export the rates are 5s. higher. The market has been firm but quiet. In spite of the determined efforts which were made during the past week to bring about a settlement of the molders' strike, no such happy conclusion has yet materialized.

As to steel the only change seems to be the increasing stringency in supplies available for sale. It is reported that most works are booked up till March. There is a pressing demand from abroad, prices apparently being no object, the only desire being to secure material. Unfortunately manufacturers are not in a position to accept the business.

Material for France

The Smith-Eisemann Corporation of America, New York, in the importing and exporting business, has about completed placing orders for material for 15,000 tons of plates and shipbuilding material for France. It has bought 8000 tons of ship plates, channels, angles and bars from the United States Shipping Board. About 5000 tons are located at storage points of the Emergency Fleet Corporation at Leetsdale and Pottstown. About 3000 tons are located at plants of the American Bridge Co., at Toledo, Elmira, N. Y., Gary, Ind., and Walkerville, Ont. The property at Walkerville had been sent into Canada in bond and will be refreighted to the United States in bond for export. The purchases also included 40 deck winches, 10 windlasses and some 50 steam pumps, and the company will have to supply the boiler equipment needed.

Export Notes

The Belgian inquiry for 4-wheel freight cars is again active and probably will be closed. The number now being figured on is 15,000.

The Rumanian bridge of 12,000 tons over the Danube River is also again under consideration, and Rumania desires in addition to buy 2000 to 3000 cars. In both cases the suppliers are asked to accept Rumanian treasury notes. It is expected that the bridge builders, at least, will demand other financial arrangements.

Japan is again in the market for numerous small tonnages of plates, and sales have been made at 3.25c., Pittsburgh.

An inquiry has been brought to the United States for 3800 tons of structural steel for the Burmah Oil Co., India, which is in addition to some 20,000 tons under consideration some months ago.

IRON AND INDUSTRIAL STOCKS

Substantial Setback Based on Money Market Conditions Is Recorded

NEW YORK, Jan. 12.

A substantial setback in prices quoted for iron and industrial stocks has been recorded during the past week. The setback is based entirely on money market conditions and has no direct bearing whatever on developments in our industrial activities.

In recent stock market sessions some irregularity has developed in spots where earnings of corporations cannot be ignored. Baldwin Locomotive is a case in point, having established a new high record price for this movement on buying prompted by the corporation's splendid business outlook. American Locomotive has not fared as well marketwise, and industrials such as American Car & Foundry, General Electric and Worthington Pump have been backward.

The largest losses are recorded in the steel and automobile groups notwithstanding the excellent buying of United States Steel on the strength of its December unfilled tonnage showing. Recent buying of Sloss-Sheffield was based on the advance in the company's pig iron quotations. Railway Steel Spring's market following has increased on the theory that the return of the railroads will be followed by a heavy demand for the company's products.

Copper shares have fallen into lower ground in common with the general list, although losses in them are small as compared with those registered in the steel and automobile issues. Probably this fact is due to the recent heavy sales of copper metal. The December sales of the red metal were larger than those for any previous month in the history of the industry. The bulk of them were to domestic consumers and the balance for export.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	48½- 52½	Int. Har. pf.	113¾-114
Allis-Chalm. pf.	88⅞- 91½	Lackaw. Steel	84½- 89⅞
Am. Can com.	54 - 58¾	Lake Sup. Corp.	20⅞- 21¾
Am. Can pf.	99¼-100	Midvale Steel	50¼- 51⅞
Am. Cr. & F. cm.	136 -141⅜	Nat.-Acme	36¾- 37½
Am. Cr. & F. pf.	115 -115¼	Nat. E. & St. cm.	82½- 87¼
Am. Loco. com.	98½-103½	Nat. E. & St. pf.	— -102¼
Am. Loco. pf.	105 -106	N. Y. Air Brake.	109¼-112⅜
Am. Ship com.	118 -120	Nova Scotia Stl.	71⅞- 80½
Am. Ship pf.	— - 80	Pittsb. Steel pf.	— - 94¾
Am. Stl. Fdr. cm.	43½- 46¼	Pressed Stl. com.	97½-100½
Am. Stl. Fdr. pf.	93¼- 93½	Pressed Stl. pf.	100½-103½
Bald. Loco. com.	113½-120½	Ry. Stl. Spg. com.	97¾-100½
Bald. Loco. pf.	— -102½	Rd. Stl. Spg. pf.	104½-106
Beth. Stl. com.	93½- 94½	Replogle Steel	47 - 47½
Beth. Stl. Cl. B.	95¼- 99⅞	Republic com.	113½-120⅝
Beth. Steel, 8 per cent, pf.	113½-113⅝	Republic pf.	106 -106¾
Case, J. I., pf.	99 - 99½	Sloss com.	75 - 79½
Central Fdry. pf.	— - 48½	Superior Steel	49 - 49¼
Chic. Pneu. Tool.	102 -104¾	Sup. Steel 1st pf.	— -102
Colo. Fuel	41⅛- 43½	Transue-Williams	61½- 64
Cru. Steel com.	202 -217¾	U. S. Alloy Steel	50 - 52½
Cru. Steel pf.	99¾-100	U. S. Pipe com.	21¼- 23¾
Deere & Co. pf.	— -100	U. S. Pipe pf.	53½- 55
Gen. Electric	168 -170½	U. S. Steel com.	105½-107¼
Gt. No. Ore. Cert.	39 - 40¾	U. S. Steel pf.	114¾-115½
Gulf States Stl.	79 - 84⅞	Vana. Steel	51¼- 56
Hb.-Wk. Ref., pf.	— -102	Va. I. C. & Coke	80¼- 82
Int. Har. com.	127 -132¾	Westingh. Elec.	53⅛- 54¼

Dividends

The Carbon Steel Co., quarterly, 2 per cent on the common, payable Jan. 15, semi-annual 4 per cent on the first preferred, payable March 30, and annual 6 per cent on the second preferred, payable July 30.

The J. I. Case Plow Works, quarterly, 1¾ per cent on the first and second preferred, payable Jan. 2.

The La Belle Iron Works, quarterly, 1½ per cent on the common and 2 per cent on the preferred, payable Jan. 2.

The United Alloy Steel Corporation, quarterly, $1, payable Jan. 20.

The United States Radiator Co., 7 per cent, payable Jan. 25.

The Standard Underground Cable Co., quarterly, 3 per cent, extra 3 per cent and special 3 per cent, payable Jan. 10.

The American Rolling Mill Co., quarterly, 75c. and 5 per cent in common stock on the common, quarterly, 1½ per cent on the preferred and 1¾ per cent on the debenture stock, all payable Jan. 15.

The American Radiator Co., quarterly, 3 per cent and extra 4 per cent on the common, payable March 31, and 1¾ per cent on the preferred, payable Feb. 16.

The Harbison-Walker Refractories Co., quarterly, 1½ per cent on the preferred, payable Jan. 20.

New Motor Accessories Company

The Kennedy Corporation, recently formed in Baltimore with capital of $2,000,000, has acquired a 4½-acre site at Curtis Bay, where construction work will begin at once on a plant to employ about 1200 workers in the production of automobile parts. The new corporation, financed by Baltimore capital, is headed by Joseph P. Kennedy, who is also president of the Baltimore Malleable Iron & Steel Castings Co. and the Kennedy Foundry Co. The new plant is expected to be ready for operation by May 1, as about $5,000,000 worth of contracts have been closed on which initial delivery is promised by July 1. The company will specialize in the manufacture of motor cylinders, gear cases and tractor and automobile accessories. The plant equipment includes four open-hearth smelting furnaces, operated by fuel oil and seven furnaces burning powdered coal. This plant is the first of the automobile industry to be established in Baltimore and is the only one of its kind in the East. The present construction includes only one unit of the complete plans; the second will probably be started within a year.

Locomotives and Car Orders in 1919 the Smallest Known

Locomotives ordered for service in the United States during 1919 amounted to only 214, which marks a record in the history of the country's railroads so low as to be almost impossible of belief, says *Railway Age*, in its annual review issue, Jan. 2, 1920. Orders placed by Canadian roads totalled 58, while those for export were 898, the total for all three items being 1170. This contrasts with 1182 locomotives ordered for domestic use alone in 1908, the poorest preceding year since 1901. In 1918 there were 2593 locomotives ordered for domestic service in the United States, 209 for Canada and 2086 for export, including those for the army in France.

Freight cars ordered for domestic service in the United States in 1919 were 29,893, "a figure so low as to make almost ridiculous a comparison with previous years." For use in Canada 3837 freight cars were ordered in 1919 and for export to other countries 3994. These totals compare with 114,113 cars for domestic use in 1918, with 9657 cars for roads in Canada and with 53,547 for export.

The number of passenger cars ordered in 1919 was 782, of which 292 were for use in the United States, 347 for Canada and 143 for export. In 1918 the corresponding figures were 131 for domestic service and 26 for export.

Apollo Steel Co. Making Extensions

The Apollo Steel Co., Apollo, Pa., makers of galvanized sheets, will make some large additions to its plant, contracts for most of the new equipment having been placed. The concern will add two jobbing mills with a capacity for rolling plates up to 54-in. wide, also four hot sheet mills to roll sheets up to 48-in. wide, and two stands of cold mills. All the present mills, and also the new mills will be electrically driven, and the company will install a 1800-hp. motor, also three 15-ton electric cranes and two 30-ton electric cranes, the latter to have 10-ton auxiliaries. The present galvanizing department will be remodeled and enlarged by the addition of two more pots, together with all necessary annealing and other equipment. The concern will also build a new brick and steel warehouse, 72 x 344-ft. The company is also figuring on installing a plant for pulverizing coal, but a definite decision on this has not yet been reached. This concern now has capacity for turning out 4500 to 5000 tons of galvanized sheets per month, and with the new mills and the two additional galvanizing pots, its output of galvanized sheets will be increased 50 per cent, or more. Work on these additions will be started within a very short time.

Cambria Steel Co. Making Extensions

The Cambria Steel Co., Johnstown, Pa., announces that as part of its constructive program, which will eventually require an expenditure of close to $15,000,000, two central boiler plants will be built at once at a total cost of about $2,000,000. Work on these will be started in a very short time. The official announcement made by the company as to its extensions to be made at Johnstown follows:

Owing to the ever increasing demands for steam, due to works expansion, the Cambria Steel Co. has decided to install at its Johnstown plants 12,000 hp. of latest type boilers and superheaters. Eight thousand of this horsepower will be installed at the Franklin works near the open hearth mills, and 4,000 of the horsepower at the Cambria works near the electric plant. The total cost of these boilers is approximated to be close to $7,000,000.

These boilers and superheaters will be erected in brick and steel buildings, absolutely fireproof in every particular, and are the latest make of the Babcock and Wilcox type. The buildings housing these boilers and superheaters will be so constructed that a large subway will extend the entire longitudinal length of the houses so that standard gage ash cars can be placed underneath the boilers receiving ashes direct from non-clinkering grates.

The Cambria Steel Co. has authorized construction of a plant for building tank cars at its Franklin works. For this purpose the sum of $1,750,000 has been appropriated and already the major portion of the tools for construction of tank cars has been placed.

Wyman & Gordon Co. Expansion

The Wyman & Gordon Co., Worcester, Mass., manufacturer of forgings, with crankshafts as the specialty, has purchased the business and plant of the Ingalls-Shepard Forging Co., Chicago. Important improvements will be made at the newly acquired works, and those already under way at Worcester and others already planned will be carried forward, until the present Wyman & Gordon capacity will be doubled. The company will concentrate hereafter on heavier types of automobile work, and with this end in view has sold its Cleveland works to the Cleveland Drop Forge Co., as heretofore reported in THE IRON AGE, this plant being equipped for light work only. The improvements at Worcester, and to a large extent those contemplated in Chicago also will consist of the installation of additional equipment, especially of the heavier types used in the manufacture of forgings. Headquarters of the business will remain in Worcester, with the management vested in President George F. Fuller and Vice-President and General Manager Harry G. Stoddard. The capitalization of the company has been increased to $4,000,000, all the new stock being privately subscribed.

Buys Canton Foundry

The Canton, Ohio, plant of the Henry Miller Foundry Co. has been purchased by a group of men, including H. H. Timken, president Timken Roller Bearing Co.; J. G. Obermier, factory manager of the same company; Charles Balough, secretary and general manager Hercules Motor Mfg. Co.; Gordon N. Mather, Toledo, vice-president Hercules Motor Mfg. Co., Canton, and R. W. Gallagher, of Cleveland. They have incorporated the Motor Castings Co., which will operate the plant. It is planned to increase its capacity.

The American Rolling Mill Co., Middletown, Ohio, has approved plans for an eight-sheet mill unit for its Zanesville, Ohio, works. One-half of that unit, or four mills, will be added at once, increasing the capacity of its Zanesville works 50 per cent.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
		Electro-	New	New	St.	New	St.
Jan.	Lake	lytic	York	York	Louis	York	Louis
7	19.75	19.50	61.00	8.75	8.50	9.80	9.45
8	19.62½	19.37½	61.00	8.75	8.50	9.75	9.40
9	19.50	19.25	64.00	8.75	8.50	9.70	9.35
10	19.50	19.25	.....	8.75	8.50	9.70	9.35
12	19.50	19.25	64.50	8.75	8.50	9.70	9.35
13	19.50	19.25	65.00	8.87½	8.62½	9.72½	9.37½

NEW YORK, Jan. 13.

Most of the markets are quieter, partly due to a slowing down of speculation in London. The tone of all, however, is strong. The copper market is quieter and slightly easier. Tin continues to be erratic and higher. Lead is still scarce and advancing. The zinc market is less active and prices are firm.

New York

Copper.—As a result of the unusually heavy buying in the last weeks of last year, both for domestic and foreign account, demand has slackened and the market is quieter with prices slightly easier. There continues, however, to be a fairly active interest in the market. Electrolytic copper for early delivery is quoted at 19.25c., New York, with Lake at 19.50c. to 19.75c., New York. Stocks in the hands of producers continue large but have been materially reduced in the last two months. With the advent of peace and unrestricted international trading possible, it is believed that demand from all sources will increase as the weeks go on.

Copper Averages.—The average price of Lake copper for the month of December, based on daily quotations in THE IRON AGE, was 19.01c. The average price of electrolytic copper was 18.63c.

Tin.—The market continues to be largely influenced by the highly speculative conditions ruling in London, where in the last nine or 10 weeks Straits tin has advanced about £100 per ton, the quotation to-day being £379 10s. per ton for spot delivery, an increase of £15 10s. over the price ruling a week ago. As a result the quotation in New York to-day is 65c. On Thursday, Jan. 8, heavy sales were made, estimated to have totaled 1000 tons, the price ranging from 60.25c. to 61.75c. Much of this business was done by sellers taking profits on metal bought at 52.50c. to 55c. some weeks ago. Some of the larger consumers were buyers as well as some of the smaller, and dealers were also active participants in transactions. There is a suspicion that large consumers may not be well covered for future needs, but it is thought by some that they are better provided for than is suspected. This can only be determined by the outcome of the usual buying for spring consumption, which usually takes place a little later. Arrivals of tin so far this month have been 940 tons, of which 700 tons came in at Atlantic ports. The quantity afloat is 7320 tons.

Lead.—This market is quiet and it appears as if demand was growing less. Prices, however, continue very firm but spot lead is still almost impossible to obtain. Appraisal of prices for early delivery is difficult, but it is believed that 8.87½c., New York, is the lowest at which the early delivery metal would be sold if obtainable. Yesterday the American Smelting & Refining Co. again advanced the price from 8c. to 8.25c., New York, or 7.75c. to 8c., St. Louis. The outside market, which is the predominant one, may be quoted at 8.62½c., St. Louis, or 8.87½c., New York, with some sellers insisting that the metal for early delivery is not obtainable at less than 9c., New York.

Zinc.—This market has closely followed conditions in London, where the unusually active speculation a week ago has abated to a considerable extent. Demand is lighter and prices are slightly easier at 9.37½c., St. Louis, or 9.72½c., New York, for prime Western for January and first quarter delivery. Some metal from second hands is available at these prices, but not much from producers who are comfortably sold up for first quarter. The market both here and in London is temporarily in a stage of transition, but producers are generally confident that still higher prices will prevail here later. Galvanizers are apparently covered for the immediate future because of stocks held over from the steel and coal strikes, but they will probably be obliged to buy actively as the year advances. This is also largely true of brass makers.

Antimony.—Because of the considerably better demand and the development of a scarcity of metal, particularly from China, prices are higher at 10.25c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—Wholesale lots of virgin aluminum, 98 to 99 per cent pure, are quoted at about 31.50c. to 32.50c., New York, for early delivery.

Old Metals.—The market is firm. Dealers' selling prices are reported as follows:

	Cents per lb.
Copper, heavy and crucible	19.75
Copper, heavy and wire	18.75
Copper, light and bottoms	16.75
Brass, heavy	14.00
Brass, light	10.00
Heavy machine composition	19.00
No. 1 yellow rod brass turnings	12.00
No. 1 red brass or composition turnings	16.50
Lead, heavy	7.50
Lead, tea	5.25
Zinc	6.00

Chicago

Jan. 13.—All the metals have advanced above the quotations of a week ago. Buying of Lake copper is general and, though large tonnages have been placed, producers seem to be trying to keep prices from getting out of bounds. Tin is strong and is changing hands freely. Trading in lead has been limited but the market is strong because large requirements are known to be unsatisfied. Buying of spelter has been widespread but conservative. Antimony is not moving freely but is strong in anticipation of heavy demand. We quote Lake copper 20.50c. for carloads, tin 65c. to 67c., lead 8.25c., spelter 9.37½c. and antimony 12c. On old metals we quote copper wires, crucible shapes, 16.50c.; copper clips, 16.50c.; copper bottoms, 15c.; red brass, 16.50c.; yellow brass 12.50c.; lead pipe, 6c.; zinc, 6c.; pewter, No. 1, 37.50c.; tinfoil, 42.50c., and block tin, 52.50c., all these being buying prices for less than carload lots.

St. Louis

Jan. 12.—The non-ferrous markets have been firmer during the week with lead up to 8.25c in carlots and spelter at 9.50c. In less than car lots lead is 8.50c and spelter, 9.75c to 9.85c. Tin, copper and antimony are unchanged from last week in less than car lots. In the Joplin district ores are firmer with zinc blende ranging as high as $60 per ton on top grades, basis 60 per cent. Lead ore was $92.50 per ton, basis 80 per cent and calamine $35 per ton, basis 40 per cent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 10c.; heavy red brass, 13c.; heavy copper and copper wire, 16c.; pewter, 35c.; tinfoil, 43c.; zinc, 4c.; lead, 4.50c.; tea lead, 3.50c.; aluminum, 22c.

The Material Handling Machinery Manufacturers' Association will meet in open convention at the Waldorf-Astoria Hotel, New York, Jan. 29 and 30. Manufacturers of cranes of all kinds, hoists, winches, conveyors, trucks, tractors, trailers, elevators, motors and electrical control apparatus are invited to attend. The two days will be divided into morning and afternoon sessions at which papers on mechanical handling will be read and discussed and moving pictures of the latest and largest installations shown. There will be a formal luncheon Jan. 29, for which a prominent speaker will be provided.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

(Prices quoted below represent as closely as they can be given those charged by mills to their regular trade for indefinite shipment. Owing to practical famine in supply of finished steel products and the heavy demand existing, tenders of new business are being made to the mills by jobbers and consumers at higher prices than those quoted below, but as a rule the mills are turning this offered business away.)

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c. Indianapolis, 25c. Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload, 40,000 lb.; and $1.25 minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c.; minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not quoted above rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.40c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50, and shorter than 1 in., $2.00. Bright basic wire, $3 to $3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.10 base
Large boiler rivets.....$4.20
Small rivets, ¼ in., 5/16 in. and 7/16 in. diameter, 50 per cent off list
Machine bolts, hp. nuts, ⅜ in. x 4 in.:
  Smaller and shorter, rolled threads.50 and 10 per cent off list
  Cut threads.....50 per cent off list
  Larger and longer sizes.....40 and 5 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
  Smaller and shorter.....40 and 5 per cent off list
  Larger and longer.....35 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
  Smaller and shorter, rolled threads.45 and 5 per cent off list
  Cut threads.....40 and 5 per cent off list
  Larger and longer sizes.....30 and 10 per cent off list
Lag bolts.....50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3.....50 per cent off list
Plow bolts, Nos. 4 to 10.....60 plus 20 per cent off list
Hot pressed nuts, sq. blank.....2.50c. per lb. off list
Hot pressed nuts, hex. blank.....2.50c. per lb. off list
Hot pressed nuts, sq. tapped.....2.25c. per lb. off list
Hot pressed nuts, hex. tapped.....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank....2.50c. per lb off list
C.p.c. and t. sq. and hex. nuts, tapped...2.25c. per lb. off list
Semi-finished hex. nuts:
  ⅝ in. and larger.....65 per cent off list
  9/16 in. and smaller.....70 and 10 per cent off list
Stove bolts in packages.....75-10 per cent off list
Stove bolts in bulk.....75-10-2½ per cent off list
Tire bolts.....60-10 per cent off list

The above discounts are from Nov. 1, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $65; chain rods, $65 to $70; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ in., 9/16 in. and larger, $3.35 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅜ in., 7/16 in. and smaller, $3.85 to $4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; track bolts, $4.35 to $4.50 per 100 lb. in carload lots of 200 kegs or more, with the usual extras for small lots. Boat and barge spikes, $3.85 to $4 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 275c. from mill. Bar iron, 3.50c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	50½	24	⅛ and ¼	29½	2½
½	54½	40	⅜	30½	3½
¾ to 3	57½	44	½	34½	16½
			¾ to 1½	30	23½

Lap Weld

2	50½	38	1¼	24½	9½
2½ to 6	53½	41	1½	31½	17½
7 to 12	50½	37	2	32½	18½
13 and 14	41	..	2½ to 6	34½	21½
15	38½	..	7 to 12	31½	18½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	46½	29	⅛, ¼ and ⅜	28½	11½
½	51½	39	½	33½	20½
¾ to 1½	55½	43	¾ to 1½	39½	24½
2 to 3	56½	44			

Lap Weld, extra strong, plain ends

2	48½	37	1¼	25½	10½
2½ to 4	51½	40	1½	31½	17½
4½ to 6	50½	39	2	33½	20½
7 to 8	46½	33	2½ to 4	35	23½
9 to 12	41½	28	4½ to 6	34½	22½
			7 to 8	26½	14
			9 to 12	21½	9½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	3½ to 4½ in.	—16
2½ to 3¼ in.	30½	3 to 3¼ in.	— 1½
2½ in.	24	2½ to 2⅝ in.	+ 1
1¾ to 2 in.	19½	2 to 2¼ in.	+10
		1¾ to 1⅞ in.	+20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

Blue Annealed—Bessemer

	Cents per lb.
No. 8 and heavier	3.50
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 and 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.25
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55

Galvanized, Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70
Nos. 12 to 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	5.10
Nos. 22 to 24	5.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.40
Nos. 30½ and 31	4.45

PERSONAL

W. M. Corse, formerly general manager of the Titanium Bronze Co. and more recently technical superintendent of the Ohio Brass Co., has become general manager of the Monel Metal Products Corporation, Bayonne, N. J., the appointment being effective Jan. 1.

L. C. Kenyon, who has covered the New England territory for the Heald Machine Co., Worcester, Mass., has been transferred to the company's New York City branch.

John Fraser, consulting engineer, 30 Church Street, New York, has been appointed consulting engineer for the Empire Tube & Steel Corporation, College Point, L. I. He has also been elected a director and vice-president of that corporation.

Albert B. Allen, formerly cashier of the First National Bank, has been made treasurer of the American Tap & Die Co., Greenfield, Mass. He succeeds Walter E. Nichols, resigned, who was with the concern for 41 years.

B. M. Jones & Co., Inc., selling agent for Mushet steels and Taylor iron, formerly at 824 Engineers' Building, Cleveland, has moved to 115 St. Clair Avenue, N. W. Fred. J. Holden is manager for the Cleveland district. Walter E. Sargent, formerly of Detroit, is now with the New York sales office, 192 Chambers Street, New York.

F. H. Grimshaw, formerly with the Diebold Products Co., Cleveland, is now acting as demonstrator for the Heald Machine Co., Worcester, Mass.

Frank K. Smith has resigned as manager of the Australasian and South African departments of the United States Steel Products Co. and has joined the Foreign Trades Co., Inc., 468 Broad Street, New York, as vice-president. He was with the National Tube Co. and the United States Steel Products Co. nearly 28 years, over 19 of which were spent in the foreign field in London, Johannesburg and Sydney, Australia, having been manager of the branch offices in the latter two places.

Major J. F. Surridge, recently demobilized after serving two years with the 35th Engineers, has accepted a position as superintendent of the American Steel Co. of Cuba, Havana, Cuba.

W. R. Tyson, who has been for the last 10 years with the Tioga Steel & Iron Co., Philadelphia, severed his connection wtih that company on Dec. 15 to become manager of forging sales for the Becker Steel Co. of America, Inc., 154 Nassau Street, New York. He will make his headquarters for the present at the plant, Charleston. W. Va.

The engineering firm of John A. Stevens, with headquarters at Lowell, Mass., and offices in Akron and Cleveland, has opened a branch at Fall River, Mass., with Carl J. Sittinger in charge. Mr. Stevens is vice-president of the American Society of Mechanical Engineers.

Richard Peters, Jr., for several years with the Philadelphia office of Rogers, Brown & Co, has become associated with the Robert C. Lea & Co., dealers in pig iron, iron ore, ferroalloys, coal, coke and limestone, Stephen Girard Building, Philadelphia.

Dr. W. H. Walker has been placed in charge of the Division of Industrial Co-operation and Research, Massachusetts Institute of Technology, Cambridge, Mass. Approximately 125 of the country's largest industries have signed contracts for this industrial service, as annual retainers ranging from $1,000 to $25,000.

The Keystone Export Corporation, 39 to 41 Cortlandt Street, New York, announces that Albert Cory, who had been traveling in the countries of the Levant since July, 1919, is due to arrive at New York on the "Regina d'Italia" about the middle of January. Mr. Cory has traveled through Turkey, Greece, Egypt, and Bulgaria, and has studied conditions and possibilities for American products after the settlement of peace with Turkey and other countries. With Mr. Cory is coming Rahamin Franco, of the banking and commission firm of Franco, Israel, Alalouf & Co., Smyrna, with branches in Constantinople and other important cities of Asia Minor. Mr. Franco will obtain agencies from manufacturers who are interested in the market of the Near East.

Theodore Roberts, foreman at the Harley Co. plant, Indian Orchard, Mass., metal bearings, has resigned his position there and is in business for himself, having established a brass and aluminum foundry in West Springfield.

Freyn, Brassert & Co., engineers, Chicago, announce the appointment of F. L. Collins as power and electrical engineer. Mr. Collins was formerly with the Illinois Steel Co., South and Gary works, and Universal Portland Cement Co. at Buffington as electrical engineer, later joining the Dominion Iron & Steel Co., Sydney, N. S., as chief electrical engineer. Subsequently he was with the ordnance department of the United States Steel Corporation at Neville Island, and lately was chief electrical engineer of the Pittsburgh Crucible Steel Co.

James S. Utley, New York, has been elected treasurer of the Gorham Mfg. Co. in place of Alfred K. Potter, who resigned. Mr. Potter continues as vice-president of the company.

Johnson Morgan, formerly purchasing agent of the Midvale Steel and Ordnance Co., Eddystone Rifle Plant, Eddystone, Pa., will join the sales engineering staff of the Winchester Repeating Arms Co., New Haven, Conn., on Jan. 15. Mr. Morgan served for the past two years as a captain in the Ordnance Department, and during the last six months of the war was in charge of the small arms branch, Small Arms and Machine Gun Section, Procurement Division.

J. Tennyson Seller, for the past six years in charge of industrial relations at the Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned his position.

J. H. Corley, for the past seven years employed by the Geo. D. Whitcomb Co., haulage machinery, Rochelle, Ill., as head salesman and sales manager, severed his connection on Jan. 1.

At the November meeting of the board of directors of the Johnson Bronze Co., New Castle, Pa., P. J. Flaherty was elected to the presidency of the company to fill the vacancy created by the death of G. W. Johnson. Mr. Flaherty, who organized the company, has in reality been the executive head since January, 1909. When he took charge of the plant of the Johnson Bronze Co. in 1909 (this company was then known as the American Car & Ship Hardware Co.) the products manufactured were steam and electric car fittings. There was very little business, and he discarded the old line of manufactures and began to develop the automobile part and bronze bushing business. He is also president of the Lawrence County Manufacturers' Association.

M. V. Dreyspool, until lately general manager of sales Rownson, Drew & Clydesdale, Inc., 68 William Street, New York, has entered business for himself under the firm name of M. V. Dreyspool, Room 531, Emigrant Bank Building, 51 Chambers Street, New York, where he will sell iron, steel and hardware for export and for domestic consumption. He has had an experience of 18 years with iron and steel. He began his business career in 1900 with the Central of Georgia Railway Co. and three years later entered the purchasing department of the New York Central. In 1905 he became the New York representative of the Phoenix Iron Co., in which position he remained for 10 years. In 1915 he entered the steel export field and visited all the important steel mills from coast to coast.

Edward J. Kearney, secretary-treasurer Kearney & Trecker Co., Milwaukee, has been elected president of the American Exchange Bank and its affiliated concern, the Bay View Commercial & Savings Bank of Milwaukee. Mr. Kearney was one of the founders of the Amer-

ican Exchange Bank and served as a director since that time, being elected chairman of the board of directors a year ago.

H. W. McAteer, president American Steel Export Co., is now in Europe on a tour covering the territories in which the company is operating. As indicative of the need in the export trade of having in the field widely distributed representatives, the company, together with its subsidiary, the Automotive Products Corporation, has representatives at the moment in such countries as Holland, China, Argentina, Brazil, Italy, Spain, New Zealand, Cuba, Egypt and the west coast of Africa.

S. M. Wetmore has been appointed district sales manager of the Detroit territory for the Hammond Steel Co., Inc., Syracuse, N. Y., specialist in the manufacture of high-grade tool and alloy steels and die blocks. Mr. Wetmore comes to this company with 25 years of practical experience on alloy and special steels.

Herbert H. Ives has been appointed manager of the Philadelphia office of the Charles Dreifus Co., scrap dealer, Pittsburgh, succeeding J. B. Partridge, Jr., who has gone into business on his own account as a partner in the Allen R. Hoffer Co. Mr. Ives has been connected with the Dreifus company for 10 years, three years in the Pittsburgh office and the last seven years in Philadelphia. George S. Gates has been appointed by Mr. Ives as his assistant.

W. R. Phibbs has resigned as assistant general manager of the Steel & Tube Co. of America, Mayville, Wis., to become Eastern representative of the James A. Brady Foundry Co., Chicago, manufacturer of the Herrington forced draft and vertical stoker.

J. P. Pero, organizer of the New England Foundrymen's Association and past president of the American Foundrymen's Association, has retired from the positions of general superintendent and sales manager of the Missouri Malleable Iron Co., East St. Louis, Ill., after 30 years spent in gray iron work and 20 years with malleable foundries. Mr. Pero was born in Waltham, Mass., Dec. 9, 1856. He became an apprentice molder in February, 1870, and was made foreman in 1882. Later experience included the management of foundries in the Middle West and in New England. In December, 1887, he formed the New England Foundrymen's Association, the first organization of foundrymen for the study of technical problems. He was president of the American Foundrymen's Association in 1916-17 and has been a director for several years.

A. P. Stephenson, who has been credit manager for the National Malleable Castings Co., Cleveland, has been promoted to the position of treasurer of the company's Indianapolis plant. He has been prominently identified with the Cleveland Association of Credit Men.

Hugo M. Marquette, Milwaukee, has joined the Merrill Machinery & Supply Co., Merrill, Wis., as production manager. The Merrill company operates a foundry and machine shop and acts as jobber of shop and mill equipment. Mr. Marquette has been connected with the George H. Smith Steel Casting Co., Milwaukee, for several years.

Ernest T. Pearsons, recently with the Locomobile Co., Bridgeport, Conn., and formerly with the Winton Motor Car Co., Cleveland, and the Packard Motor Car Co., Detroit, has been made body engineer for the Stevens-Duryea, Inc., Chicopee, Mass.

E. W. Bernhard, formerly of Providence, R. I., and for a number of years with the Hess-Bright Mfg. Co., Philadelphia, as planning manager, has been made assistant to the general factory manager; H. W. Jackson, also of the same concern, has been promoted to factory manager.

R. W. Rogers, Cornell '04, and Col. Wm. C. Rogers, West Point '93, have associated themselves in a Production Service, with offices at 390 Belmont Avenue, Newark, N. J. The Production Service will undertake to organize, discipline and create co-operation among operatives, and to produce a 50 per cent reduction in preventable losses and conditions as found at the time of contract as compared with the conditions resulting in a year thereafter.

L. Sevier, former vice-president of the Sloss-Sheffield Steel & Iron Co., has taken charge as president of the Alabama Manufacturers' Association and inaugurated a campaign for active membership throughout the State with a special view to the export trade.

At the annual meeting of the board of directors of the Doehler-Die-Casting Co., Brooklyn, N. Y., on Jan. 5, the following officers were re-elected: H. H. Doehler, president; H. B. Griffin, vice-president; O. A. Schroeder, treasurer; O. A. Lewis, assistant secretary. They also added to their list of officers the following: J. Kralund, second vice-president, in charge of production, and Charles Pack, secretary and chief chemist.

After an illness of six weeks due to injuries sustained when he was struck by a motor truck, Joseph G. Butler, Jr., vice-president Brier Hill Steel Co., Youngstown, Ohio, and a director of the American Iron and Steel Institute, has returned to his desk in the Stambaugh Building.

Fred S. Overton has been elected secretary of the Ingersoll-Rand Co., New York, to fill the vacancy caused by the death of Fred A. Brainerd.

OBITUARY

JAMES MCLEAN, president Phelps, Dodge Mercantile Co., New York, and an officer and director in many railroads and mining enterprises, died Jan. 8 at his home at 907 Fifth Avenue, New York. He was born in New York Dec. 18, 1845. Soon after the Civil War he joined White & Haskell, metal brokers in New York, where he remained until 1874, when he was sent to Chicago by Phelps, Dodge & Co. At its reorganization he was made vice-president and remained a director until his death. He was director and member of the executive committee of the El Paso & Southwestern Railroad and its subsidiaries, director of the Old Dominion Co. and the United Globe Mines and a director and member of the executive committee of the Lehigh Valley Railroad. He was a member of the American Institute of Mining Engineers.

DANIEL H. NEWEY, SR., 52, operating superintendent of the Western Reserve Works of the Brier Hill Steel Co., Youngstown, Ohio, was instantly killed Jan. 7 when a sheet mill housing weighing 10 tons fell on him while being removed from its foundations. A workman, Daniel Suich, was also killed. Mr. Newey lived in Niles, Ohio, and had been associated with the steel industry in the Mahoning Valley for 30 years.

JOSEPH ISADORE MITCHELL, assistant manufacturing superintendent General Electric Co., Pittsfield, Mass., died Jan. 7 at his home in that city, after an illness of six months. Mr. Mitchell was born in Leicester, Eng., about 61 years ago, and had lived in Pittsfield since 1908.

ALFRED WORTHINGTON TREDWAY, a prominent jobber of hardware in Iowa, died at his home in Dubuque, Dec. 30, aged 68. He was president of the A. Tredway & Sons Hardware Co. and vice-president of the John Ernsdorff Iron Co.

COL. CHARLES ALEXANDER, prominently connected with Canadian steel corporations as well as the American Screw Co., Providence, R. I., and other domestic companies, died at Providence, Dec. 29.

CHARLES ACKERMAN, for many years sales manager of the Lancaster Iron Works, died suddenly Jan. 8 at his home, 810 Bushwick Avenue, Brooklyn, aged 53 years.

JAMES CLARKE, manager Clarke Brass Foundry, Kansas City, Mo., died at his home in that city on Dec. 26.

CHARLES A. SWAINE, president of the Fred J. Swaine Mfg. Co., St. Louis, arch presses, died Dec. 31.

Machinery Markets and News of the Works

TRADE CONTINUES ACTIVE

Business in Machine Tools and Allied Equipment Is Good

Midvale Steel & Ordnance Co. Buys $500,000 Worth of Machinery for Car Shops

From all machinery selling centers come reports of continued activity. While there have not been many large projects brought forward since the first of the year, there is sustained and widespread buying of small lots of tools.

One of the largest buyers is the Midvale Steel & Ordnance Co., Philadelphia, which has placed orders totaling about $500,000 for forging presses, punching and shearing machines, bolt and rivet machines and tools for extensions at its Franklin car shops, Johnstown, Pa. Another buyer in the Philadelphia district is the Westinghouse Electric & Mfg. Co., whose plant at Essington is being greatly enlarged at a cost of several million dollars. The company will consolidate the manufacture of turbines and auxiliary equipment at Essington and will move some equipment from its East Pittsburgh plant. The latter plant will be devoted to manufacture of electrical equipment. Considerable buying of new tools will be done for both Essington and East Pittsburgh plants.

Other buying in the Philadelphia market has included the placing of orders by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for about 25 tools, and the American Insulating Machinery Co., Philadelphia, has bought a list of tools. The General Tractors Co., Paulsboro N. J., has received many quotations and is expected to purchase equipment soon.

In New York the market has been less active so far as large deals are concerned, but there is a good volume of business in small lots. The American Locomotive Co. still has considerable equipment to buy, particularly plateworking machinery. The Empire Cream Separator Co. and the Simms Magneto Co., both at Bloomfield, N. J., have come into the market for tools. The Dominion Bridge Co., Montreal, Que., has bought a number of large, used tools.

The General Electric Co. is placing orders at Boston against its 1920 list and larger purchases are expected. The Northway Motors Co., Natick, Mass., is adding to its equipment.

Cleveland dealers report continued good business from automobile manufacturers and those making parts and accessories. The Fisher Ohio Body Corporation, which will build a plant at Cleveland, is in the market for a large lot of sheet metal and woodworking machinery.

At Pittsburgh the Aluminum Co. of America has issued a list of about 30 machines.

Chicago reports several inquiries from the St. Louis district, one coming from the Missouri, Kansas & Texas Railroad and another, for 16 turret lathes, from the Emerson Electric Mfg. Co., St. Louis. The Continental Motors Corporation, Muskegon, Mich., recently placed orders in Chicago totaling about $150,000.

Deliveries of machine tools are getting worse and some prices are higher.

An unusually large volume of crane business has been placed in the last two weeks and some manufacturers are sold as far ahead as they care to be in view of the increasing prices for steel.

New York

NEW YORK, Jan. 13.

While business so far this month has been of good proportions, the orders have been largely for single machines or small lots, no large buying or inquiry having been reported. Buying is at such a good rate that the principal fear is that it cannot be sustained throughout the year. A let-up would not be unwelcome, however, to some machine-tool manufacturers, who are sold up for so many months ahead that they hesitate to commit themselves more extensively in view of the rising costs of raw materials.

A feature of recent business is the excellent demand for plate fabricating machinery. Among the companies which have bought this class of equipment are the American Car & Foundry Co. and the Midvale Steel & Ordnance Co., for car work; the American Bridge Co., for ship fabrication at Trenton, N. J., and the American Locomotive Co. will soon be in the market for quite a number of machines. The Concrete Steel Co., New York, has bought five punching machines.

The Empire Cream Separator Co., Bloomfield, N. J., has bought a few tools and will soon be in the market for more equipment to increase its output of cream separators and cow milking machines. The Simms Magneto Co., Bloomfield, also has bought a few tools. The Federal Shipbuilding Co., Kearny, N. J., is in the market for five 14 in. lathes for ships.

The Dominion Bridge Co., Montreal, Que., has been a fairly large buyer of heavy tools. Its appropriation for new equipment is said to total several hundred thousand dollars.

The George S. Foss Machinery & Supply Co. will move shortly from 30 Church Street, New York, to 174 Lafayette Street, where it will have ample floor space for the display of new and used tools. A stock of factory supplies will also be carried.

The locomotive crane builders have placed a number of cranes in the Middle West and West, where the labor shortage is being felt, and some concerns are making arrangements to carry larger coal reserves. Two crane companies have increased prices from 5 to 10 per cent since Jan. 1. There is a slight shortage of small motors. The General Motors Corporation is in the market for several small transfer cranes and has purchased some locomotive cranes.

The H. G. Vogel Co., New York, manufacturer of sprinklers, is inquiring for a 3-ton overhead traveling crane with span from 28 to 30 ft. and magnets for handling 6-in. cast iron pipe. The Concrete Steel Co., 42 Broadway, New York, is in the market for a special crane. Niles-Bement-Pond Co. has an inquiry from a customer in Chile for 22 hoists, ranging from 1100 lb. to 11,000 lb. capacity, metric specifications. There is also an inquiry in the market for a 15-ton double beam hand power crane, span 18 ft. 11 in., for South America. J. A. Rubino, iron and steel, Newark, N. J., is inquiring for a 2-ton, 16-ft. span, hand-power crane.

The inquiry for cranes without electric equipment by the Westinghouse Electric & Mfg. Co. for the Essington plant has been divided between three crane manufacturers. The inquiry for 14 cranes from Follansbee Brothers Co., Pittsburgh, made several weeks ago, has been placed with the Alliance Machine Co., Alliance, Ohio. Pawling & Harnischfeger Co. was the low bidder, with delivery at 150 days, on the two 15-ton traveling bridge cranes for the Washington Navy Yard. The Whiting Foundry Equipment Co. was sec-

ond, delivery 135 days, and Manning, Maxwell & Moore third, delivery 115 days. The order for the three 3-ton, 48-ft. span cranes for the John Simmons plant, has been placed by Westinghouse, Church, Kerr with the Toledo Bridge & Crane Co. The Kennedy Van Saun Mfg. & Engineering Co., 120 Broadway, New York, has purchased a 10-ton and 30-ton overhead traveling crane from the Bedford Foundry & Machine Co. The Morgan Engineering Co. has sold 16 cranes to the Algoma Steel Corporation, Sault Ste. Marie, Ont. The Willys Corporation crane inquiry will be awarded this week, probably divided between three companies.

The Brewer-Titchener Corporation, Cortland, N. Y., recently voted $500,000 for expanding its manufacturing facilities. Plans include an addition to its forging shop accommodating about twenty-five 3000-lb. drop hammers and other equipment. Additions will increase the output of its bow socket plant to 4500 sets per day and the building of an up-to-date stamping plant at its Crandal Stone Division, Binghamton, N. Y. It is hoped that this added capacity will be in operation by July.

The R. & L. Bearings Co., 1790 Broadway, New York, recently increased its capital stock to $50,000 for the purpose of financing its new plant at 260 Thirteenth Street, Long Island City, N. Y., which will be operated for regrinding ball bearings, manufacturing thrust bearings and making special machine bushings and bolts to order. The plant will be in operation some time this month.

The Aluminum Manufacturers, Inc., Garwood, N. J., manufacturers of aluminum, brass and bronze castings, is planning extensions in manufacture to include the production of aluminum forgings and aluminum wheels for motor vehicles. It is proposed to build plants at locations to be selected for this additional production.

Fire, Jan. 3, destroyed one of the buildings at the plant of the Western Cartridge Co., Little Falls, N. J., with loss estimated at $10,000.

The Overman Cushion Tire Co., Cortlandt and Rutgers streets, Belleville, N. J., is taking bids for a two-story addition, 64 x 120 ft., to make its second plant unit, and the first of three such buildings planned for early erection.

The Weehawken Dry Dock Co., foot of Baldwin Avenue, Weehawken, N. J., has acquired about 2200 ft. frontage on the Hudson River at North Bergen and Guttenberg for a new drydock for a consideration said to be about $2,000,000. Its present yard is in the section which the Cunard Steamship Co., New York, proposes to take over for a new freight terminal. The new plant with machine and general construction shops is estimated to cost over $5,000,000.

The Foot Mfg. Co., 36 Germania Avenue, Jersey City, N. J., manufacturer of platers' equipment, buffing apparatus, etc., has filed plans for extensions at 34-40 Liberty Avenue, to cost about $6,000.

The Radio Spark Plug Co., Belleville, N. J., has been incorporated with a capital stock of $120,000 by William J. Martin, John H. Becker and Lester E. Beardslee.

The Simms Magneto Co., North Arlington Avenue, East Orange, N. J., is planning plant enlargements for increased output.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire products, has completed plans for a six-story addition, 80 x 200 ft., for general manufacturing. A three-story building, 50 x 100 ft., will also be erected.

The Air Reduction Co., 175 Pacific Avenue, Jersey City, N. J., manufacturer of acetylene welding and cutting equipment, has filed plans for an addition to cost $62,000.

The Standard Ordnance Corporation, 115 Broadway, New York, has acquired the factory and property of the National Carbon Co., Carbon Place, Jersey City, N. J.

The Stanwood Rubber Co., Newark, N. J., is planning for a new power plant at its factory, at Frelinghuysen Avenue near Virginia Street, to be two stories, 75 by 84 ft.

The Iron-Bound Box Co., 169 Chestnut Street, Newark, N. J., has filed notice of organization. Vincenz Memoli, 172 Chestnut Street, heads the company.

The High Speed Engine Corporation, Newark, N. J., recently organized, is planning for the early operation of its plant now in course of erection at 231-7 Murray Street. The factory will be one-story, 27 x 100 ft., and will be devoted to the manufacture of a new type of rotary steam engine. Leonard M. Randolph is president, and H. C. Gardner, treasurer.

The Quick Alarm Fire Detector Corporation, New York, has been incorporated with a capital stock of $50,000 by E. J. Chapman, J. F. Faulhaber and E. T. Morrissey, 451 East 141st Street, to manufacture metallic alarm devices.

The Sidney B. Bowman Automobile Co., 1672 Broadway, New York, has purchased an entire block on Broadway, between West 131st and 132d streets, about 100 x 200 ft., as site for a service and repair works estimated to cost over $300,000.

The Bessemer Truck Service Co., New York, has leased the building at 540-42 West Sixtieth Street, for a service and repair works.

The Bird-Archer Co., 90 West Street, New York, manufacturer of marine products, has increased its capital stock from $200,000 to $350,000.

The Ajax Fastener Co., New York, has been incorporated with a capital of $100,000 by S. Katz, M. N. Cohenne and R. Steiner, 239 East Twenty-sixth Street, to manufacture metal snap fasteners.

Henry Hessner & Son, Brooklyn, wheelwright, 33 Bartlett Street, have had plans prepared for a one-story plant, 100 x 200 ft., to cost about $65,000, including equipment.

The Page Foundry Corporation, Brooklyn, has been incorporated with a capital stock of $30,000 by H. E. Diamond, M. Klein and A. Werner, 52 West 119th Street.

The United Metal Spinning Co., 103 Mott Street, New York, has completed plans for a five-story building, 67 x 100 ft., at 440 Adelphi Street, Brooklyn. The company recently increased its capital stock from $40,000 to $100,000.

The White Metal Bed Corporation, 999 Metropolitan Avenue, Brooklyn, has leased for 10 years a five-story factory at 571-73 Flushing Avenue, comprising about 25,000 sq. ft. of floor space, for increased operations.

The Perfect Window Regulator Co., 415 Greenpoint Avenue, Brooklyn, has arranged for the construction of a new one-story plant, 95 x 240 ft., at Harris and Van Alst avenues, Long Island City, N. Y.

The McPhilben Light Fixture Co., 264 Fulton Street, Brooklyn, manufacturer of metal lighting fixtures, has acquired property, 56 x 114 ft., fronting on the Long Island Railroad, near Jamaica Avenue, Jamaica, N. Y., as a site for a new plant.

The Fairley-Davidson Steel Co., 122 Maiden Lane, New York, has increased its capital stock from $15,000 to $100,000.

Buffalo

BUFFALO, Jan. 12.

The Keuka Industries, Inc., Hammondsport, N. Y., recently incorporarted, has acquired the plant of the Curtiss Corporation at this place and will use it for the production of automobile engines. The plant comprises forge and heat-treating department, electro-plating and polishing shops, machine shops, tinsmithing and acetylene welding departments, assembling, testing departments, etc. It is planned to begin operations at an early date, with initial production devoted to contract work for motors, developing later into standard shop motor production. L. J. Seely is president; J. H. McNamara, vice-president; and K. B. MacDonald, secretary and treasurer.

The American Car & Foundry Co., Buffalo, N. Y., is perfecting plans for rebuilding its plant on Babcock Street. A number of the present buildings will be razed and new structures erected for increased capacity for car-wheel manufacture and repair work. The works are now giving employment to about 500 men and it is said that this number will be doubled. It is proposed to inaugurate construction in the spring. The Depew, N. Y., works of the company are being modeled for regular construction work, instead of munition production as during the war. The plant is now employing 500 men and when in full operation will have a working force of close to 1100.

The Hartford-Fairmont Co., Canajoharie, N. Y., manufacturer of glass machinery, with works at Hartford, Conn., has increased its capital stock from $500.000 to $1,000,000. It has taken bids for an addition to its Hartford plant, comprising about 28,000 sq. ft. floor space.

The Tonawanda Power Co., North Tonawanda, N. Y., is planning for extensions and improvements in its plant and system to cost about $200,000.

Fire, Jan. 8, destroyed the four-story factory of the Strutzer Automobile Mfg. Co., 145-7 Seneca Street, Buffalo, manufacturer of automobile bodies, parts, etc., with loss reported at $300,000.

The Jamestown Metal Desk Co., Wellman Building, Jamestown, N. Y., has had plans prepared for a one-story plant on Blackstone Avenue, 80 x 220 ft., to cost $50,000.

The Kellogg Mfg. Co., 3 Circle Street, Rochester, N. Y., manufacturer of air pumps, etc., has awarded a contract to Alexander Shumway, 255 Sherwood Avenue, for a one-story machine shop, 200 x 800 ft., on Humboldt Street, to cost about $200,000, including equipment.

The 1920 construction plans of the H. H. Franklin Mfg. Co., 302 South Geddes Street, Syracuse, N. Y., include the erection of extensions to provide about 500,000 sq. ft. additional manufacturing space, making the total works aggregate about 34½ acres.

Fire, Jan. 1, destroyed a portion of the plant of the Erie Car Works, Seventeenth and Raspberry streets, Erie, Pa., with loss reported at $200,000, including equipment. The structures destroyed were blacksmith and forge shop, repair shop and other buildings.

The Covert Gear Co., Grant Street, Lockport, N. Y., has awarded a contract to the Curran & Swartout Co., Rochester, N. Y., for a plant addition.

The Crown Mfg. Co., Phelps, N. Y., manufacturer of grain drills, etc., is considering plans for doubling its capacity. E. F. Needham is president, and J. F. Needham, secretary.

New England

BOSTON, Jan. 12.

The machine-tool market appears to be on the edge of a substantial buying movement. Business the past week has been somewhat limited, but dealers have received a large number of inquiries which should bring results in the near future. Orders for small tools are numerous and large and many manufacturers have sufficient orders booked to operate at capacity for several months. A large inquiry for standard machine-tool products is noted, and material inroads have been made on reserve stocks the past month. Prices on new machines are strong and one make of lathes has been advanced $100. The delivery situation is practically unchanged, but if anything is a little more extended. Activity in the second-hand tool market is confined largely among dealers.

The General Electric Co., Lynn, Mass., has been buying a few tools against its 1920 list, and it is the general opinion that large purchases will begin before the close of another week. It is still taking on a few tools at 1919 prices. The United Shoe Machinery Corporation, Beverly, Mass., has not been sufficiently informed by its representatives in France, where a new plant is to be built, to determine just how much new equipment will be needed there. The Northway Motors Co., Natick, Mass., has bought a number of machines for its expansion program and has inquiries out for others. The Revere Rubber Co., Providence, R. I., has bought a lathe and is in the market for a universal grinder and other equipment. Its new building will contain a thoroughly up-to-date tool room. The William H. Haskell Mfg. Co., Pawtucket, R. I., has purchased a 36-in. x 10-ft. planer, 48-in. x 12-ft. planer, 24-in. shaper, 15-in. shaper, three 16-in. lathes, 4-ft. radial drill, horizontal boring and drilling machine, No. 2 Universal milling machine and a small plain grinder. Most of this equipment was bought direct from the manufacturers. The company is now out of the market.

Some large machine tools have been installed at the Charlestown Navy Yard, Boston, including a planer 14 ft. high and 40 ft. long that can plane 16 ft. wide; a 20-ft. boring mill and an 8-ft. floor boring machine. Machines being installed include a 120-in. crankshaft lathe with a 50-ft. bed and a 96-in. planer having a 24-ft. bed, in addition to a number of salvaged tools brought from Buffalo. The equipment is being placed in an extension to the old tool shop. The number of men employed at the yard is about 65 per cent of normal.

The Murray & Tregurtha Corporation, Quincy, Mass., has been bought by a group of Boston banking interests, who have formed a new corporation with a capitalization of $1,250,000 common and $1,000,000 preferred stock, fully subscribed. It has a one-story plant on the Neponset River and manufactures high grade marine motors. The company is not in the market for machine tools, but hopes to increase the business until further plant expansion is necessary. The board of directors is composed of M. Douglas Flattery, chairman; Linus C. Coggan, treasurer; Raymond Emerson; Otis C. Funderburk, vice-president and chief engineer; John A. Murray, president; John F. Perkins; Frank B. Sexton, vice-president and sales manager; William P. Thurber; Guy Tressler, factory manager; Walter H. Tufts, Jr., and Roger S. Warner. The company also has stock control in the Victory Truck Co., which produces a heavy duty hand truck with a worm-gear feature.

The Worcester Machine Works, Inc., Worcester, Mass., which was incorporated in 1918 with a capital stock of $50,000, has changed its name to Churchill, Morgan, Crittinger, Inc., following the selling of his interest by Winfred L. Griffith. Ralph L. Morgan is president; Lewis M. Crittinger, treasurer, and Edwin Churchill, Jr., a director of the new company.

Plans are completed for a new factory for the Petroleum Heating & Power Co. at Stamford, Conn.

Work has begun on the four-story factory, 40 x 140 ft., for the Everett Factories Corporation, Everett, Mass. It is asking for information on belt conveying machinery.

The Aeolian Co., Meriden, Conn., has let contract for the erection of a four-story addition, 50 x 101 ft. The project includes an extension to the boiler house. A Manning upright boiler has been purchased.

Work is about to start on additions and alterations on buildings Nos. 1 and 2 of the Potter & Johnson Machine Co., Pawtucket, R. I. A foundry, 63 x 277 ft., is to be built. James L. Potter, Newport Avenue, is treasurer.

The Fowler Nail Co., Seymour, Conn., will move to Buffalo as soon as a new factory there is completed.

The Autoyre Co., Oakville, Conn., manufacturer of wire products, metal stampings, etc., has had plans drawn for a one-story addition, 60 x 150 ft.

The Sanford Riley Stoker Co., 25 Foster Street, Worcester, Mass., manufacturer of mechanical stokers, has acquired property on West Boylston Street and plans the construction of an addition.

The Presteel Mfg. Co., Bridgeport, Conn., has increased its capital stock to $50,000.

The Metropolitan Body Co., Bridgeport, Conn., manufacturer of automobile bodies, has perfected plans for the erection of a one-story plant, 56 x 93 ft., at Hurd Avenue and Grand Street.

The Stone-Franklin Co., Inc., Greenwich, Conn., has been incorporated in Delaware with capital of $750,000 by Ralph C. Coburn, Charles M. Walker and William Truelove, to manufacture marine equipment and other metal products.

The American Specialty Co., Bridgeport, Conn., manufacturer of springs and other metal products, is having plans prepared for the erection of a three-story brick addition, 40 x 142 ft., on Howland Avenue.

Leigh & Butler, Boston, Mass., manufacturers of textile machinery, have acquired the plant formerly occupied by the Baker Mfg. Co., New Bedford, and will remove its works to this location.

Philadelphia

PHILADELPHIA, Jan. 13.

One of the largest buyers of equipment in this market in the new year is the Midvale Steel & Ordnance Co., which has placed orders totaling about $500,000 for extensions to its Franklin car works at Johnstown, Pa. The equipment purchased includes forging presses, punches and shears, bolt and rivet machines and machine tools. The directors of the company have made an appropriation of $1,750,000 for the necessary buildings and machinery. With the added facilities the tank works will have a capacity of 10 tanks a day; the capacity of the car shops will be increased to 48 cars a day and 1500 tons of car repair will be produced monthly.

Another buyer is the Westinghouse Electric & Mfg. Co., which has started work at Essington, Pa., on additions to its plant, for which about $5,000,000 will be expended, this amount including the expenditure which will be made for new machine-tool equipment. The new buildings are to be an extension of the erecting shop, 125 x 300 ft.; a No. 3 machine shop, 125 x 600 ft.; a light machine shop for small turbines, 130 x 508 ft., and a warehouse, 80 x 500 ft. and three stories. When these buildings are completed, the entire turbine and auxiliary equipment department of the Westinghouse company will be located at Essington and the buildings now used for turbine work at East Pittsburgh, Pa., will be used by the company for the manufacture of electrical equipment. Some of the machine tools in use at East Pittsburgh will be moved to Essington, but considerable new equipment will be bought both for the Essington plant and the East Pittsburgh plant. The Westinghouse company will be one of the large buyers of machine tools in the next few months. The improvement at Essington will increase the capacity of the company's turbine manufacturing department about 50 per cent. Both land and marine turbines will be built, the plant having originally been constructed at the request of the Emergency Fleet Corporation to manufacture marine turbines for Fleet Corporation ships.

Good sized orders have also been placed among local dealers by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., and the American Insulating Machinery Co., Philadelphia. The General Tractors Co., Paulsboro, N. J., has received a good many quotations on new equipment, but so far no important purchases have been made. There is no lack of optimism as to the volume of machine-tool business that will be done this year, some dealers going

so far as to predict that 1920 will be the banner year for the trade.

The Philadelphia Storage Battery Co., Ontario Street, Philadelphia, has arranged for the immediate erection of a three-story addition, 50 x 220 ft. and 26 x 50 ft., to cost about $50,000.

The Ordnance Department, Washington, has had plans prepared for a three-story and basement, brick and reinforced concrete experimental shop, 60 x 201 ft., at the Frankford Arsenal, Philadelphia.

The Standard Steel Car Co., Pittsburgh, automobile department, has leased the six-story building at 142-44 North Broad Street, Philadelphia, 51 x 180 ft., for a service and repair works. The building is now occupied by the Neel-Cadillac Co., which has arranged for the erection of a similar new building at Parkway and Twenty-fifth streets. The Eastern Motors Co. will occupy space in the structure with the Standard company.

The Standard Tin Foil Corporation, Philadelphia, has broken ground for its proposed plant at Cedar and Tioga streets, to be two stories, 130 x 260 ft., estimated to cost $200,000. The Austin Co., Bulletin Building, has the building contract.

The Motor Parts Co., 847 North Broad Street, Philadelphia, has leased the sixth floor of the building now in course of erection at Fifteenth and Mount Vernon streets for a new works department.

The Landis Machine Co., Waynesboro, Pa., has increased its capital stock from $1,000,000 to $5,000,000. J. G. Benedict is general manager.

The Adder Machine Co., Wilkes-Barre, Pa., is planning for a three-story addition to its plant in the Kingston section, 100 x 100 ft., to cost about $100,000.

Fire, Jan. 8, destroyed the plant of the Harrisburg Pattern & Model Works, Harrisburg, Pa.

The Road Machine Co., 231 North George Avenue, York, Pa., will build a one-story boiler plant on Grantley Street, 40 x 50 ft., to cost about $20,000. Harry Road is president and treasurer.

The American Steel & Wire Co., Hamilton Avenue, Trenton, has awarded a contract to the J. H. Morris Co., Broad Street Bank Building, Philadelphia, for a one-story addition, 60 x 100 ft., to cost $25,000.

The Vineland Foundry & Mfg. Co., Camden, N. J., has been incorporated with a capital stock of $50,000 by George H. B. Martin and John A. MacPeak.

The Spicer Mfg. Co., Plainfield, N. J., manufacturer of drop forgings for automobile use, etc., has commenced the erection of a one-story addition to its plant on Keim Street, Pottstown, Pa., 60 x 113 ft., to cost about $20,000.

A new company has been organized by V. S. Messinger, Easton, Pa., and associates, to manufacture iron and steel products. Property has been acquired at Upper Mill, near Bushville Park, fronting on Bushville Creek, as a site for the proposed works. The tract comprises about 50 acres and the initial plant will consist of a number of buildings to give employment to about 150 men. It is said that this force will be increased later to about 500 men. The local board of trade, with which Mr. Messinger is connected, is interested in the project.

The Buzz Spring Co., Reading, Pa., has been incorporated with a capital stock of $100,000 by Lawrence C. Bright, Rudolph Pabska, Reading; and W. A. Baer, East Greenville, Pa., to manufacture springs and other metal products.

The Scientific Mfg. Co., Scranton, Pa., has been incorporated with a capital stock of $15,000 by J. C. Fritts and associates, to manufacture mechanical equipment.

The Smith & Howley Co., Scranton, Pa., has been incorporated with a capital stock of $50,000 by Floyd Smith and associates, to manufacture gas and electric fixtures.

The Ford & Kendig Co., 1428 Callowhill Street, Philadelphia, recently increased its capital stock from $500,000 to $1,000,000 to provide for extensions in its departments and also to capitalize a portion of its assets. Its business is divided into jobbing, specialty and power piping. A. E. Ford is president.

A. B. Groff & Sons Co., New Holland, Pa., has been incorporated with a capitalization of $100,000 to manufacture farming machinery, etc. The incorporators are A. B., LeRoy W. and C. M. Groff.

The Hall Planetary Thread Milling Machine Co., Philadelphia, has been chartered with a capital stock of $5,000 to manufacture milling machinery, etc. Peter O. G. Hall, Maurice G. Belknap, 1418 Walnut Street, and Irving C. Belknap are the incorporators.

Pittsburgh

PITTSBURGH, Jan. 12.

The Aluminum Co. of America, Pittsburgh, which now has a large plant at Marysville, Tenn., for the reduction of aluminum, is also building a large plant there to make aluminum sheets, work on which is well under way. It has already bought some small machinery needed in construction work on the new plant, but is now in the market and will close shortly for a large amount of new equipment. The company has sent out inquiries recently for machinery as follows:

One 180-in. heavy-duty stock shear, to cut ½-in. thick
One 144-in. heavy-duty stock shear, to cut ⅜-in. thick
Three 180-in. squaring shears, to cut ¼-in. steel
Three 72-in. squaring shears, to cut ¼-in. steel
Two hand-power arbor presses, one No. 3½ and one No. 5.
One motor-driven dry tool grinder, equipped with 24-in. wheels
One motor-driven grinder with wheels for grinding shear blades up to 180 in. long
One 12-in. motor-driven combination wet tool grinder
One motor-driven 12-in. slotter
One motor-driven bench type sensitive drill, ½-in. capacity
One 60-in. motor-driven, open-side planer with 12-ft. bed
One motor-driven 14-in. x 10-ft. bed, geared-head lathe
One motor-driven 10 or 12-in. x 6-ft. bed, geared-head lathe
One motor-driven 24-in. x 14-ft. bed, geared-head lathe
One No. 4 motor-driven universal drilling machine
One motor-driven floor type sensitive drill, capacity ⅝ in.
Two 8 or 10-in. motor-driven emery wheel grinders
One 18-in. motor-driven drill press
One motor-driven horizontal boring mill, with universal table, to be same type as Lucas No. 31
One motor-driven 4-ft. universal radial drill, equipped with universal table
One 8-ft. motor-driven vertical boring mill
One motor-driven 36-in. x 18-ft. bed geared-head lathe
One motor-driven 24-in. shaper

The Westinghouse Electric & Mfg. Co., Pittsburgh, is reported planning for extensions and improvements in its foundries at Trafford, Pa., to cost about $1,000,000, including machinery and equipment.

The Paragon Motor Car Co., Connellsville, Pa., recently organized with a capital of $3,000,000, has completed negotiations with the local chamber of commerce for the establishment of its plant in that city. It is said the proposed works, with equipment, will involve an expenditure closely approximating $1,500,000. J. Fred Kurtz is president; F. W. Wright, secretary, and E. E. Markell, treasurer.

The McClintic-Marshall Construction Co., Pittsburgh, manufacturer of structural steel and iron products, has acquired through its realty department the Kenilworth Land Co., about 10 acres of property at Leetsdale, formerly held by the Penn Brick Co.

The Spider Paper Hanging Machine Co., Connellsville, Pa., has been incorporated with a capital stock of $50,000 by Steven Canellos and Peter Malacos.

The Mehun Mfg. Co., Arrott Building, Pittsburgh, recently organized, has inaugurated operations in two departments of the new business, including one for tool and die work and metal stamping, and the other for general machine work and manufacture. It is considering enlargements in its plant.

The Royal Block Coal Co., Morrisvale, W. Va., is considering rebuilding its power plant, recently destroyed by fire with loss of about $20,000.

The Libby-Owens Sheet Glass Co., Kanawha City, W. Va., is considering plans for plant additions to cost about $2,000,000, including glass-making and general operating machinery.

The Winding Gulf Colliery Co., Winding Gulf, W. Va., will soon take bids for a one and two-story machine shop, 50 x 148 ft., to cost about $30,000. E. C. Berkeley is superintendent.

The Chesapeake & Ohio Railroad Co., Richmond, Va., is planning additions to its railroad and repair shops at Huntington, W. Va., to cost about $500,000. It is said that the work will be inaugurated as soon as the road is released by the Railroad Administration, and will include enlargements to the tin and pipe shops and other departments, particularly those devoted to steel coal cars. F. I. Cabell is chief engineer.

The Whitaker-Glessner Co., Wheeling, W. Va., has commenced the remodeling of the plant of the Ceiling & Roofing Co., Warwood, recently acquired through its subsidiary,

the Wheeling Corrugating Co. Machinery will be installed for the manufacture of machine parts and specialties to be used by the can manufacturing interests of the corporation. Operations will be inaugurated by Feb. 1, giving employment to about 100 men.

The Pittsburgh Screw Machine Products Co., 458 Melwood Avenue, Pittsburgh, has been authorized to increase its capital stock from $5,000 to $75,000. Lee C. Wassel is secretary.

The Iron Trade Products Co., Farm Bank Building, Pittsburgh, Pa., has been authorized to increase its capital stock from $25,000 to $200,000. L. J. Adler is secretary.

The Mack & Paterson Machine Co., Penn and Brushton streets, Pittsburgh, Pa., has changed its name to the Paterson Metal Products Co.

The Bronze Die Casting Co., Pittsburgh, has been chartered to manufacture iron and steel castings, forgings, dies, etc. The capitalization is $10,000. J. Sidney and James H. Hammond, 624 Clyde Street, and Edward A. Pitcairn, 5431 Fifth Avenue, Pittsburgh, are the incorporators.

The Southeast

BALTIMORE, Jan. 12.

In a report for December, made by George C. Smith, director of the industrial bureau of the Board of Trade, Baltimore, it is shown that nine new industries located in Baltimore and expansions of 17 industries were initiated. New industries will require 1975 new employees and represent a plant investment of more than $12,000,000. The expansions, as reported to the bureau, will employ 1137 more workers and will involve construction and new equipment to total about $3,870,000. Of the new industries the American Sugar Refining Co. is the largest. Among the others are the Locke Insulator Co. of Rochester and Victor, N. Y., and the Union Acid Works, which will build a $1,000,000 plant. Among the expansions are the Baltimore Car & Foundry Co., the Chesapeake Iron Works, the Curtis Bay Copper & Iron Works, and the Crown Cork & Seal Co. The report further shows that since June 1, 53 new industries, requiring 11,400 new employees and representing a plant investment of $25,500,000 were attracted to Baltimore. During the same time there were 102 expansions announced, adding 11,100 employees and totaling $31,000,000 in plant investment.

The Kennedy Corporation, Charles and Wells streets, Baltimore, has been organized with $2,000,000 capital stock and will establish a plant in the Curtis Bay section to specialize in the manufacture of cylinders, gear cases and other automobile and tractor parts. Contracts already placed with the new concern amount to $5,000,000. The new corporation is headed by Joseph P. Kennedy, but has no connection with the Kennedy Foundry Co. or Baltimore Malleable Iron & Steel Co., of which Mr. Kennedy is president. Construction work on the plant is to start immediately and it is expected to be in operation by May 1. Initial deliveries on contracts are to be made on or before July 1. A site of 4½ acres has been acquired and modern steel and concrete buildings will be constructed. The equipment will include four open-hearth melting furnaces operated by fuel oil and seven annealing furnaces using powdered coal. About 1200 workers will be employed.

With $1,000,000 capital stock, the Baltimore Cork Co., 1920 North Gay Street, Baltimore, has been incorporated to manufacture stoppers, crowns, caps, etc., by Walter A. Wood, John B. Myers and Andrew E. Nickol.

The Westminster Mill & Body Co., Westminster, Md., has been incorporated with $20,000 capital stock to manufacture and equip motor car bodies, etc. The incorporators are N. Claude Erb, Harvey W. Frey, Arthur P. Rainey, John H. Cunningham and Mary E. Erb.

The Titusville Forge Co., 213 Fidelity Building, Baltimore, has been incorporated with $1,200,000 capital stock to engage in the iron and steel business at Titusville, Pa. The incorporators are Henry W. Williams, R. Guy Cochran and George J. Schedel.

The Baltimore Steel Co., Eden Street and Eastern Avenue, Baltimore, has been incorporated with $40,000 capital stock to manufacture metals. The incorporators are Gilbert A. Wehr, Robert Q. Herring and J. Gordon Macdonald.

For the purpose of engaging in the general machine-shop business, the Paragon Engineers, Inc., Light and Poultney streets, Baltimore, has been incorporated with $100,000 capital stock by Spencer Heath, William D. Moore and Archie C. Fleagle.

The Electromechanical Co., 530 North Calvert Street, Baltimore, electrical and mechanical engineer, has increased its capital stock from $15,000 to $50,000. It has sold its present place of business and at the corner of Calvert and Franklin streets has purchased five properties which it will consolidate into one building of 20,000 sq. ft. floor space. H. E. Nichols is manager of repairs; W. W. Thompson, of construction, and L. M. Brooks, of sales.

The Wilmington & Philadelphia Traction Co., Wilmington, Del., is planning for the installation of electrical equipment for increased power service at its plant at New Castle, Del.

The proposed new plant of the American Cellulose & Chemical Co., Cumberland, Md., to be located at Amcelleie, will consist of a unit about the size of the one now nearing completion and will be equipped for the manufacture of cellulose acetate. The plant, with equipment, is estimated to cost $2,000,000. Guy Leonard is manager.

The Peters Wagon & Auto Works, Ensor and East streets, Baltimore, have filed notice of change of name to the Peters Auto Body & Spring Works, to specialize in automobile bodies and springs.

The Union Shipbuilding Co., Fairfield, Baltimore, is having plans prepared for two two-story additions, 75 x 160 ft. and 75 x 100 ft., to cost about $40,000 and $30,000 respectively. F. C. Strauffen is manager of construction.

The Harrison-Landauer Co., Calvert Building, Baltimore, is in the market for special equipment, including a triple effect evaporator, with capacity of about 1000 gal. per hr.; vacuum pumps; one or two Oliver filters, with about 400 sq. ft. surface, and two plate presses, about 300 sq. ft. combined filtering area.

The McNamara Brothers, Inc., Kloman Street, Westport, Baltimore, manufacturer of tanks, boilers, etc., has had plans prepared for a one-story addition, 80 x 200 ft., to cost $50,000.

The McNerny Motor Air Brake Co., Miami, Fla., has been incorporated with a capital stock of $100,000 to manufacture air brakes for automobiles. It plans the erection of a local plant. Clyde J. McNerny is president and John H. Twaddell, secretary.

The Cherrystone Oil & Fertilizer Co., Cape Charles, Va., recently organized with a capital stock of $250,000, is planning for a local plant for the manufacture of fertilizers. William M. Wooster is secretary.

The Southern Spring Bed Co., Hill Street, Atlanta, Ga., is planning a plant addition to provide about 150,000 sq. ft. additional manufacturing floor space.

The Bruce Motor Truck Co., Tampa, Fla., has been organized with a capital of $500,000 to establish a local plant for the manufacture of motor trucks and parts. Clarence W. Bruce is president.

The Corbitt Service Co., Henderson, N. C., is planning a new service and repair works, 100 x 150 ft. It was recently incorporated with a capital stock of $100,000. R. J. Corbitt is president.

The Faison Co., Greensboro, N. C., has been incorporated with a capital stock of $50,000 by Ralph R. and Preston Faison, Greensboro, and William A. Faison, Chester, Pa., to manufacture iron and steel castings, etc.

In connection with its proposed plant, the Spruce Pine Sand & Gravel Co., Spruce Pine, Ala., will install a generating plant, boilers and pumping equipment. The main works will consist of a hydraulic gravel washing and screening plant with daily capacity of about 1000 tons. Charles B. Crow is treasurer and general manager. James A. Barr, Mount Pleasant, Tenn., is construction engineer.

The Chattanooga Road Machinery Co., Chattanooga, Tenn., has perfected plans for a plant for the manufacture of metal culverts. J. H. Dean is president.

Chicago

CHICAGO, Jan. 12.

Although there are few lists of any size before the trade, small inquiries are numerous and are almost invariably followed by orders. Road salesmen have no opportunity to do missionary work, as their time is consumed calling on live prospects. Store trade is heavy and is expected to be even more active during the automobile show to be held in this city next week. Demand continues of a general character, embracing almost all types of tools. An interesting feature of current inquiry is the relatively numerous purchases by new shops. One local seller recently booked orders covering the complete requirements of several new tractor and automobile repair shops which have been established in rural communities. This indicates that the growing consumption of automotive products by the farmer not only means expanded manufacturing capacity but a substantial increase in local repair facilities.

The largest single purchase of recent date was one for about $150,000 which was made by the Continental Motors Corporation, Muskegon, Mich., at the close of December.

The largest inquiries before the trade have been received from the St. Louis district. The Missouri, Kansas & Texas Railroad has issued a list covering its requirements and the Emerson Electric Mfg. Co., St. Louis, is in the market for 16 turret lathes.

An open line of radial drilling machines has advanced about 10 per cent, but with this exception prices continue on about the same level as heretofore. Deliveries grow worse, much of the current business being closed on the basis of May and June shipment, although both better and poorer delivery obtains on numerous machines.

Frank L. Webb, cashier, Central Mfg. District Bank, 1125 West Twenty-fifth Street, Chicago, contemplates the erection of a three-story reinforced concrete automobile salesroom and service station 36 x 163 ft., at 2633 South Michigan Avenue. It will cost about $70,000.

The H. Channon Co., 150 North Market Street, Chicago, has not been purchased by the Fairbanks Co., as reported in these columns two weeks ago. It has been denied by officers of the company.

H. Kramer & Co., 1330 West Twenty-first Street, Chicago, has awarded contracts through an architect for the construction of a one-story foundry, 127 x 200 ft.; two-story warehouse, 30 x 85 ft., and a two-story office building, 58 x 65 ft., at the northeast corner of Twenty-first Place and Loomis Street, to cost $150,000.

The Johnson Fare Box Co., 236 South Robey Street, Chicago, is asking bids on a three-story factory, 120 x 165 ft., to be erected on Ravenswood Avenue near Leland Avenue, at a cost of $120,000.

Reichert & Drews, machinists, 559 West Lake Street, Chicago, have let contract for the construction of a one-story plant, 100 x 168 ft., at 450-456 North Ashland Avenue, to cost $33,000.

George B. Limbert & Co., manufacturer of steam fitters' supplies, East Chicago, Ind., will reconstruct its one and two-story machine shop at Railroad Avenue and 145th Street. The plant was destroyed by fire Jan. 3, the total loss being estimated at $150,000.

The Ursus Motor Co., manufacturer of motor trucks, 1057 Milwaukee Avenue, Chicago, has commenced the construction of a one-story plant, 193 x 351 ft., at 6601 West Grand Avenue, at an estimated cost of $55,000.

The Illinois Steel Co., 208 South La Salle Street, Chicago, will erect a one-story addition, 41 x 67 ft., at Mackinaw Avenue and Eighty-seventh Street, to cost $6,000.

The Federal Electric Co., Eighty-seventh and State streets, Chicago, has awarded contracts for a one and two-story plant, 270 x 306 ft., at the southwest corner of State and Eighty-seventh streets, to cost $200,000.

The Walker Vehicle Co., Eighty-seventh and State streets, Chicago, has let contracts for a one-story factory, 206 x 392 ft., to cost $200,000.

The Garden City Plating & Mfg. Co., 1430 South Talman Avenue, Chicago, is receiving bids through an architect on a two-story factory, 80 x 139 ft., to be erected at 2635-45 Ogden Avenue, at a cost of $50,000.

The Fort Dearborn Metals Co., 4818 South Campbell Avenue, Chicago, has let contracts for a one-story metal refining plant, 90 x 130 ft., at 2505-2511 West Forty-eighth Street, to cost $20,000.

The Whitman & Barnes Mfg. Co., 1000 West 120th Street, Chicago, has let contract for the construction of a two-story oil storage building and pump house, 43 x 54 ft., to cost $19,000.

The Wagner Castings Co., Decatur, Ill., has purchased the plant of the Decatur Foundry Co., which it has occupied since its organization about a year ago, and plans to spend $100,000 for additions and betterments.

The Twentieth Century Mill Mfg. Co., manufacturer of small wheat milling machines, Decatur, Ill., has purchased a site in Wabash Avenue, where it will build an addition to its plant.

The Streator Car Co., Streator, Ill., will erect a plant at Kankakee for the manufacture and repair of steel freight cars.

The Service Station Equipment Co., manufacturer of garage and service station equipment, has leased a plant, 100 x 360 ft., at the southeast corner of Thirty-seventh Street and South Ashland Avenue, Chicago. Land comprising 14,000 sq. ft. adjoins the building, on which it is planned to erect an addition in the near future.

The American Stove & Range Co., Minneapolis, has purchased 10 acres on State Street between Twentieth and Twenty-first streets, East St. Louis, Ill., including the former Uneeda mills building in which a stove and range foundry will be established.

The White Lily Mfg. Co., machinist and founder, Davenport, Iowa, contemplates improvements including five additional units, each 35 x 200 ft., to cost $150,000.

Williams, White & Co., Moline, Ill., have purchased the steel for their new foundry, 150 x 325 ft., with covered material yard. The Clement A. Hardy Co., 654 Railway Exchange, Chicago, is the engineer.

The Tarkington Motor Co., Nineteenth Avenue, Rockford, Ill., has perfected plans for the erection of a one-story plant on Harrison Avenue, 100 x 500 ft., to cost about $50,000.

The Stromberg Motor Devices Co., 63 East Twenty-fifth Street, Chicago, will build a six-story plant on Wabash Street, 75 x 130 ft., to cost about $300,000, including equipment.

The Cadillac Automobile Co., 2301 South Michigan Avenue, Chicago, will build a six-story service building and repair shop, 100 x 160 ft., at Twenty-third Street and Indiana Avenue, to cost about $500,000.

The McDougal-Duluth Co., Duluth, Minn., has been incorporated with a capital of $1,000,000 by C. E. Carpenter, P. H. Ginder and William L'Estrange, to construct a local shipbuilding plant.

The Missouri Malleable Iron Co., East St. Louis, Ill., has been acquired by the National Malleable Castings Co., Cleveland, Ohio. The new owner plans for enlargements at the plant for increased output; about 800 men are now employed.

Catalogs Wanted

The Business Service Corporation, industrial engineer and accountant, National Life Building, Chicago, desires catalogs from manufacturers of machine tools, textile machinery, paper products machinery, etc., for its engineering files.

Wiley T. Rabun, 124 North Santa Fe Avenue, Huntington Park, Los Angeles, Cal., has under construction a plant at 601-605 Belgrave Avenue, and desires catalogs on general foundry, machine shop and pattern shop equipment.

Milwaukee

MILWAUKEE, Jan. 12.

New bookings the first 10 days of January have been most encouraging and inquiry is maintained at such a high level that it is felt there will be no difficulty in keeping shops well sold up until mid-year. Milling machine demand continues especially active, the automotive industries having resumed buying on a relatively large scale.

The J. I. Case Plow Works, Racine, Wis., has purchased four acres from the Mitchell Motors Co., at Mead and Water streets and the Root River, where it intends to concentrate its casting shops. Plans are being prepared for gray iron, malleable and steel foundries to be erected in the spring at an estimated cost of $500,000. The additional facilities are designed particularly for the manufacture of tractors. The Case company is a recent consolidation of the J. I. Case Plow Co. and the Wallis Tractor Co., Racine. H. M. Wallis is president and general manager.

The Doelger & Kirsten Co., 501-511 Cedar Street, Milwaukee, manufacturer of metal-working equipment, will build a new machine shop, 90 x 200 ft., at Fifth and Cedar streets, replacing its present buildings, damaged by fire a short time ago, by a fireproof structure, providing a material increase in floor space. The work is in charge of Van Ryn & DeGelleke, architects, Caswell Block, who will take bids the end of this week.

The National Gauge & Equipment Co., La Crosse, Wis., manufacturer of gages and metering devices for motor vehicles, is taking bids for the erection of a one-story brick and steel addition, 150 x 250 ft., costing about $100,000 with equipment, which is now being purchased. The present force of 600 will be increased to 1000 by May 15. P. M. Gelatt is vice-president.

It is reported that the National Motor Car & Vehicle Corporation, Indianapolis, has leased the plant of the Four Lakes Ordnance Co., Madison, Wis., and will employ it as a motor truck manufacturing plant. The ordnance shop was erected at the request of the Government by George A. Steinle, head of the Steinle Turret Machine Co., Madison. It contains 75,000 sq. ft., and a three-story addition, 150 x 300 ft., is contemplated by the lessee.

Charles W. Kings, Chicago, has opened a machine shop in the former factory of the Weyenberg Shoe Mfg. Co., Beaver Dam, Wis., for the manufacture of carbureters for the gas engine and automotive industries. At present experimental work is being done. Later complete equipment for making brass castings and doing machine work will be purchased.

The F. Rassmann Mfg. Co., Beaver Dam, Wis., manufacturer of steel barn equipment and farm accessories, will

increase by 100 per cent the capacity of its gray and malleable iron shop and machine works. The investment will be about $60,000.

The Richards Machine Co., 3427 Vliet Street, Milwaukee, established 10 years ago by Charles J. Richards, has incorporated its business without change of style. The authorized capital is $60,000. Earl Westcott, Thomas DeSwarte and Mr. Richards are the incorporators.

The Erni Washer Co., Oconomowoc, Wis., manufacturer of domestic washing machines, will build a two-story brick addition, 35 x 70 ft., costing about $15,000.

The George J. Meyer Mfg. Co., 576 Clinton Street, Milwaukee, has increased its capital stock from $400,000 to $750,000 and will build additions to its foundry, machine shop and boiler works Details are not yet available.

The Oconomowoc Wooden Toy & Specialty Co., Oconomowoc, Wis., has been incorporated with a capital stock of $50,000 and will establish a factory in the former Jones Building on Milwaukee Street. A complete equipment of woodworking and transmission machinery is being purchased. L. J. Flotow is president; A. G. Dorse, vice-president, and J. F. Kettenhoefen, secretary-treasurer.

The Milwaukee Public Sewerage Commission will erect a steam generating plant in connection with the Jones Island sewage disposal plant project, at an estimated cost of $1,250,000. It will develop 11,700 hp. and supply 8800 kw. per hr. Specifications are being prepared for three types, coal-burning boilers, oil-burning boilers, and internal combustion engines. T. Chalkley Hatton is chief engineer.

The Helgerson Foundry Co., Green Bay, Wis., on Jan. 7 placed in operation its new gray iron foundry at 1248 Main Street, having a daily capacity of 10 tons. A steel foundry is being completed and will begin operations about Feb 10. A. Helgerson is president and general manager; A. W. Gregg, foundry superintendent Whiting Foundry Equipment Co., Harvey, Ill., vice-president, and A. L. Cunard, secretary-treasurer.

The Langstadt-Meyer Co., Appleton, Wis., has let contracts for a two-story brick and steel addition, 55 x 150 ft., to be equipped for manufacturing self-contained generating systems for farm lighting. H. R. Beske, Appleton, is general contractor.

The Stinson Tractor Co., Minneapolis, has moved its general offices to Eau Claire, Wis., where it is intended to erect a new plant next spring to be the main works. The present plant at Superior, Wis., which has reached an output of one tractor a day, will be continued. J. H. Ott, Eau Claire, is general manager.

Frank Tank & Co., Rhinelander, Wis., will build a two-story addition, 60 x 90 ft., to their public garage. One floor will be equipped as a machine and repair shop.

The Schartow Mfg. Co., manufacturer of saddlery hardware, harness chains, automobile accessories, etc., with main offices at Milwaukee and plant at Racine, Wis., has commenced the erection of a one-story factory, 90 x 300 ft., at South Milwaukee, where it will remove as soon as the building is completed. R. A. Nourse is president; F. W. Schartow, vice-president, and C. P. Nourse, secretary-treasurer.

Detroit

DETROIT, Jan. 10.

The Homer Furnace Co., which recently moved to Coldwater, Mich., is organizing a $100,000 subsidiary company, to be known as the Stowkell Furnace Co. It will operate an iron jobbing foundry.

The Dort Motor Car Co., of Flint, has started the erection of a new motor manufacturing unit, which will employ 1,200 men.

Frank Noble, Benton Harbor, Mich., has purchased the spray pump business of the Benton Harbor Auto Machine Co. and will organize a company to continue production of the device.

The General Motors Corporation, Detroit, has increased its capital from $1,020,000,000 to $5,610,000,000. It is planning for the erection of an addition to its works at Dayton, Ohio, where a 34 acre tract is available for expansion.

The Nelson Nestor Truck Co., Saginaw, Mich., is building a one-story addition to its plant.

The Briscoe Motor Co., Jackson Mich., manufacturer of automobiles, has acquired the plant of the John Bohnet Co., Lansing, Mich., manufacturer of automobile bodies. The new owner will use the works for similar production, and plans to increase the capacity of this and its main plant in the near future. Frederick Cowin is president.

Frank H. Nickle, manufacturer of agitator driving yokes, a standard power transmission device for driving agitator or stirrer shafts in open or closed tanks and other containers, announces the organization of the Nickle Engineering Works, with office and factory at 729 North Niagara Street, Saginaw, Mich. The company will install additional machine shop equipment and increase the scope of operations.

California

LOS ANGELES, Jan. 6.

The San Joaquin Light & Power Corporation, Fresno, Cal., has acquired property on First Avenue as a site for the erection of a one-story machine shop and service building 150 x 225 ft., for its motor trucks.

The Hall Aeroplane Co., Los Angeles, has been incorporated with a capital of $500,000 by Charles S. Hall, J. H. Baker and Elmer E. Potter, to manufacture airplanes and parts.

The Metal Aircraft Mfg. Co., 329 East Fourth Street, Los Angeles, has filed notice of organization to manufacture airplane parts, etc. H. G. Hallquist, 1400 Melville Avenue, heads the company.

The Hovley Cushion Wheel Co., Los Angeles, has been incorporated with a capital of $500,000 by Peter P. Hovley, B. F. Coons and Wallace A. Coons, to manufacture special automobile wheels.

An ice and cold storage plant to cost about $500,000, including equipment, will be erected by the Security Warehouse & Distributing Co., San Jose, Cal.

The Los Angeles Machine Works, 230 North Los Angeles Street, Los Angeles, has filed notice of organization to manufacture machinery, parts, etc. R. E. Heidrich, 1637 West Fifty-sixth Street, heads the company.

J. C. Odell, Riverside, Cal., is planning for the establishment of a cotton ginning plant at Perris, Cal., to cost about $25,000.

The Pacific Sewer Pipe Co., American Bank Building, Los Angeles, manufacturer of vitrified pipe, will build a two-story clay grinding works, 25 x 45 ft., at 336 North Avenue 26. Harry E. Nelson is the engineer.

The Copper Products Syndicate, Los Angeles, has been incorporated with a capital of $300,000 by A. J. Mitchell and L. W. Selby, Los Angeles, and D. W. Herzog, Santa Barbara, to manufacture copper and other metal products.

The Edison Electric Appliance Co., Ontario, Cal., manufacturer of Hot Point electric heating and cooking appliances, is planning for enlargements.

A new machine shop, 30 x 40 ft., boiler plant, 40 x 80 ft., and distillery building, 30 x 40 ft., will be erected by the Los Angeles Soap Co., 633 East First Street, Los Angeles.

The American Rubber Co., Oakland, Cal., has had plans prepared for a two-story plant at Emeryville, near Oakland, to cost about $100,000, including equipment. W. J. Miller, 417 Market Street, San Francisco, is the architect.

Indianapolis

INDIANAPOLIS, Jan. 12.

The Indianapolis Pressed Steel Co., Indianapolis, has been incorporated with $14,000 capital stock. The directors are John L. Benedict, A. W. Johnson and Howard M. Benedict.

The American Metal Furniture Co., Indianapolis, has increased its capital stock from $10,000 to $35,000.

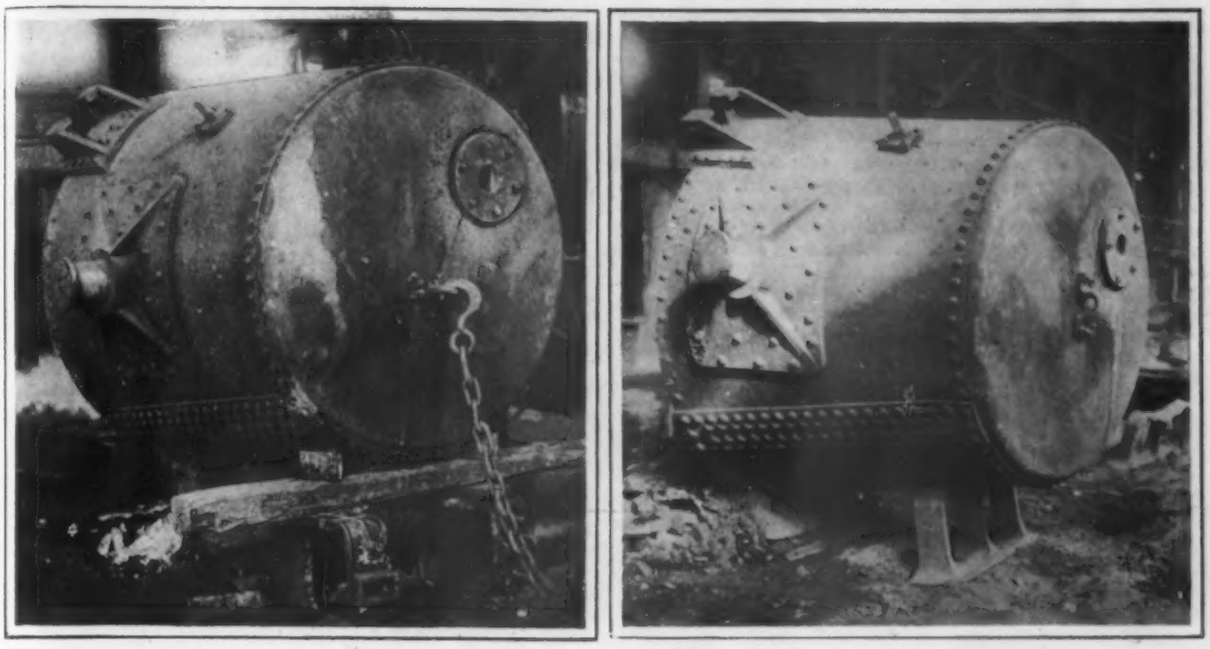
The Rub-Rex Products, Inc., Indianapolis, has been incorporated with $750,000 capital stock to manufacture rubber products. The directors are Scott C. Legge, Theodore S. Jackson, Louis E. Klug, George E. Goble and Edwin H. Emrich.

The Eagle Tool Co., Muncie, Ind., has been incorporated with $25,000 capital stock to manufacture tools. The directors are William A. McClellan, Harry A. Kleinfelder and Harry D. Stout.

The Kokomo Brass Works, Kokomo, Ind., will double the capacity of its plant and this year expects to spend about $150,000 on improvements.

The Standard Motor Parts Co., Lebanon, Ind., is having plans drawn by John Hetherington, architect of that city, for a plant which will be located on the corner of Ballard Street and the Central Indiana Railroad.

The Champion Auto Equipment Co., Hammond, Ind., has been incorporated with $100.000 capital stock and has taken over the business of the Champion Potato Machinery Co. It will erect two new manufacturing buildings, each 100 x 350 ft.



THE MAKESHIFT REST FOR A LADLE, SHOWN AT THE LEFT, HAS BEEN DISCARDED AS DANGEROUS AND COSTLY BY THE AMERICAN STEEL FOUNDRIES, INDIANA HARBOR PLANT, IN FAVOR OF THE SAFE REST, SHOWN AT THE RIGHT, DESIGNED ESPECIALLY FOR THE PURPOSE, WITH A VIEW TO ELIMINATING ACCIDENT

Canada

TORONTO, Jan. 12.

The main building of the Welland Iron & Brass Works, Welland, Ont., was destroyed by fire Jan. 5 with a loss, including machinery, estimated at more than $50,000. It is expected that work of rebuilding will start at an early date.

An explosion in the blacksmith shop of the Record Foundry & Machine Co., Moncton, N. B., Jan. 5, completely destroyed the building containing the machine shop, blacksmith shop and power plant, and partly gutted the molding shop. Valuable machinery was destroyed which will have to be replaced. The loss amounted to upward of $70,000.

The Henry Miller Foundry Co., Ltd., Cleveland, Ohio, will take over the building recently occupied by the Sherer-Gillett Co., Victoria Road, Guelph, Ont., and will install new machinery and enlarge the plant for the manufacture of heating apparatus, etc.

It is reported that an addition will be erected to the Grand Trunk car shops at London, Ont., early in the spring to cost $300,000. Recently the Grand Trunk Railway Co. appropriated $1,000,000 to be spent on shop extensions in Canada. It is the intention to increase the force at London from 800 to 1500 men.

The Nineteen Hundred Washer Co., 357 Yonge Street Toronto, is in the market for an 11-in. x 5-in. speed lathe with counter shaft; power drive punch press, Ferracute No. P.-2 or equivalent; 20-in. W. F. Barnes all-geared, four spindle gang drill, with self-feed and automatic stop; Taylor & Fenn light drill No. 42, four spindle, two heads and a 25-hp., 25-cycle, 550-volt motor.

The York Sand & Gravel, Ltd., Toronto, is in the market for a standard gage second hand locomotive and 10 4-cu. yd. side dump cars, also 36-in. gage second hand locomotive and 10 4-cu. ft. side dump cars.

Fire recently damaged the plant, machinery and patterns owned by the Katie Foundry Co., North Water Street. Galt, Ont., to the amount of about $50,000. It will rebuild and install machinery to replace that destroyed.

The Chesley Chair Co., Chesley, Ont., is in the market for a 2-spindle horizontal boring machine.

The George B. Meadows Co., Toronto, is in the market for a spot welder.

The Provincial Car & Truck Co., Ltd., Toronto, has been incorporated with a capital stock of $150,000 by Allington T. Bowlby, 39 Heath Avenue; Albert Ogden, 23 Toronto Street; Richard G. McClelland and others, to manufacture motor cars, engines, motors, etc.

The Veteran Oil Gas Heaters, Ltd., Toronto, has been incorporated with a capital stock of $500,000 by Frederic K. Watts, William Suddes, 503 Queen Street East; Richard R. Waddell, 606 Temple Building, and others, to manufacture stoves, furnaces, machinery, etc.

Clayton, Neil & Jones, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by Harry F. Clayton, 1362 King Street West; Thomas M. Jones, Bruce V. McCrimmon, 495 Brunswick Avenue; all of Toronto, Ont.; John N. Neil, Sault Ste. Marie, Ont., and others to manufacture machinery, metal products, etc.

The Western Clock Co., Ltd., Peterboro, Ont., has been incorporated with a capital stock of $100,000 by Richmond W. Hart, 1126 Traders' Bank Building; Charles H. C. Leggott, 116 Arundel Avenue; and others, all of Toronto, Ont., to manufacture clocks, watches, chronometers, machinery, tools, etc.

The Pacific Northwest

SEATTLE, Jan. 6.

Logging and sawmill equipment has been in good demand, many plants taking advantage of the car shortage to shut down and make improvements. It is stated that the Puget Sound district is in immediate need of 1200 empty cars daily, in addition to the number available.

The Simmons Bed Co., Seattle, plans the erection of a new factory on a site at First Avenue South and Spokane Avenue to cost $35,000.

The plant of the Todd Dry Docks, Inc., Seattle, was damaged by fire recently with a loss of $10,000 to the carpenter, blacksmith and joiner shops.

The J. H. Price Construction Co., Seattle, has taken over the wooden plant of the Anderson Shipbuilding Corporation at Houghton, Lake Washingtn, and will engage in the ship repair business on a large scale.

The Lake Union Dry Dock & Machine Works, Seattle, is constructing a plant on Lake Union which will cost, when completed, $100,000. The main building will be 80 x 40 ft. It will engage in general repair work.

Estep & Kimball, Seattle, will equip a $75,000 machine shop and foundry adjoining the plant of the Lake Union Dry Dock & Machine Works.

Texas

AUSTIN, Jan. 10.

The Lone Star Gas Co., Fort Worth, plans to spend $5,000,000 in constructing pipe lines and developing new natural gas supply in central west Texas. It has been furnishing Fort Worth and Dallas with natural gas obtained from Oklahoma fields. F. L. Chase is general manager.

The Home Ice & Cold Storage Co., Austin, has been incorporated with a capital of $125,000 and will build a plant. The incorporators are A. M. Fitzpatrick, C. W. Barker and W. F. Gohlke.

The Bonham Compress & Warehouse Co., Bonham, which has been incorporated with a capital stock of $29,000 will build a cotton compress and warehouse. The incorporators are R. T. Lipscomb, O. Roberts and Bland Smith.

NEW TRADE PUBLICATIONS

Weldless Wire Chains.—Chain Products Co., Cleveland, Catalog C 30, 111 pages, 8¾ x 11 in., with stiff cover. Concerned with a comprehensive line of weldless wire chain and accessories. The book is divided into three sections—coil chain, chain specialties, miscellaneous attachments and packages—all alphabetically indexed. For further ease of reference, each individual size of chain is listed separately. Eleven standard patterns of weldless wire chain are included, namely, Bulldog, Samson, Hodell, Cleveland, sash, playground, single jack, double jack, ladder, safety and plumbers'. The finishes supplied include polished bright, galvanized polished bright and luminized. The various products are illustrated.

Decarbonizing Outfit.—Davis-Bournonville Co., Jersey City, N. J. Leaflet. Describes an oxygen decarbonizing outfit and explains how to use it for burning out carbon deposits in gas engine cylinders.

Motor Driven Tools.—Stow Mfg. Co., Inc., Binghamton, N. Y. Bulletin 103. Concerned with a line of motor-driven tools, including portable drills, portable buffers and grinders, suspended tools for drilling and grinding, screw drivers, flexible grinders, tool post grinders, bench buffers and grinders, floor grinders, friction driven drills, etc. The various machines are illustrated.

Flexible Shaft and Portable Tools.—Stow Mfg. Co., Inc., Binghamton, N. Y. Bulletin 104. Concerned with flexible shaft and portable flexible shaft driven tools. The flexible shafts are made with cores from ¼ to 1⅜ in., and with plain or ball bearings. The portable tools described include surface sander, angle-boring head, breast drills, portable drill presses, screw drivers, tapping and reaming machines, flexible shaft center grinders, portable emery grinders, flexible grinders, direct-current drilling plants, and various other electrically driven tools with flexible shafts. The machines are illustrated.

Automatic Under-Feed Stoker.—Universal Automatic Under-Feed Stoker Co., Johnstown, Pa. Catalog. Describes the construction and operation of the company's automatic under-feed stoker. The text is supplemented with line drawings and half-tones.

Marine Equipment.—Thacher Propeller & Foundry Corporation, Albany, N. Y. Catalog M, 56 pages, 7 x 10 in. Concerned with a line of heavy marine hardware, which includes anchors of various types, cleats, chocks, bitts, capstans, manholes, deck irons, propellers, etc. The catalog is profusely illustrated.

Zinc Metal Sheathing.—Church Appliance Mfg. Co., La Salle, Ill. Folder. Describes the application of sheet zinc to buildings in place of sheathing or in place of building paper.

High Speed Steel.—Century Steel Co. of America, Poughkeepsie, N. Y. Booklet No. 2, with the title "The Birth of a Steel". The company's leading brand of high speed steel, known as Centurion Superior, is personified and tells the story of its conception, melting and use, in plain and untechnical language, giving in addition the analysis of the steel.

Standardized Truss Unit Buildings.—Milliken Brothers Mfg. Co., Inc., Woolworth Building. Two catalogs, 11 x 8½ in., devoted to buildings constructed by a standardized truss unit system and to meet a wide range of industrial service. This system is described as designed to facilitate transportation and minimize the use of labor and tools in erection. Catalog 10 has 44 pages and illustrates and describes the various types of buildings. Catalog 11 has 31 pages and is devoted to foundation plans, erection diagrams, construction details and complete directions for erecting the buildings. Other products described include transmission towers, radio towers and pinlock poles; the latter intended for electric light, power, telephone, trolley or similar purposes.

Employee Insurance and Industrial Service.—Postal Casualty Co., Commercial Savings Bank Building, Grand Rapids, Mich. Bulletin. Discusses industrial unrest and explains the company's plan for promoting a better feeling on the part of the employee towards the employer. This plan includes the issuing of an individual accident and health policy to the employee on behalf of the employer, the mailing to the employee of industrial service bulletins, and other services.

Motor and Generator Tests.—Wagner Electric Mfg. Co., St. Louis. Bulletin 120. A manual of electrical testing for motors and generators. Explains in detail, with diagrams, single-phase motor tests and three-phase motor and generator tests made by various methods.

Electric Hoist.—Victor R. Browning & Co., Cleveland. Catalog. Illustrates and describes an electric hoist built for use in structural shops, foundries, machine shops, loading platforms, etc. This hoist was described in THE IRON AGE, issue of Aug. 28, page 572.

High Temperature Fire Brick Cement.—Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. Bulletin. Concerned with hytempite, a high temperature fire brick cement for bonding and repairing fire clay or silica brick work about the various types of furnaces in foundries. Illustrations show it applied to ladle and cupola spouts in the iron foundry, lining and patching the melting zone of the cupola; for ladle linings, furnace walls and doors in the steel foundry; for lining furnaces in the brass foundry, and various applications in the malleable foundry.

Drum Controllers.—Cutler-Hammer Mfg. Co., Milwaukee. Pamphlet. Concerned with a line of alternating and direct current drum controllers for crane, mill and similar service. These are described as designed for accessibility and interchangeability of parts and of methods of manipulation. They are made in capacities for controlling motors from 1 to 100 hp.

Bar Iron, Screws, Bolts, Nuts.—St. Louis Screw Co., St. Louis. Catalog; 80 pages, 6 x 9 in. Lists and illustrates an extensive line of standard screws, bolts, nuts and washers; also lists various shapes and sizes of bar iron. The catalog announces that in addition to electro-galvanizing the company is now prepared to furnish these products hot galvanized. Useful tables of weights are given.

Automatic Valves.—Golden-Anderson Valve Specialty Co., Fulton Building, Pittsburgh. Catalog. Concerned with a line of automatic valves made for steam, water and air lines. These include non-return valves, emergency trip valves, combined throttle and engine stop valves, steam pressure reducing valves, controlling float valves, controlling altitude valves, water pressure regulating valves, cushioned float valves, electrically operated water service valves, etc. Automatic standpipes for railroads are also described.

Railroad Power Plant and Industrial Equipment.—Walter A. Zelnicker Supply Co., St. Louis. Bulletin 270. Lists a stock of new and relaying rails and equipment, locomotives, railroad cars, steam shovels, power plant and industrial equipment, contractors' machinery, etc.

Centrifugal Pumps.—Alberger Pump & Condenser Co., New York. Catalog F. Deals with centrifugal pumps and steam turbines made under Curtis patents. The pumps illustrated and described include standard and regular volute, vertical shaft volute, turbo-volute, multi-stage and turbine pumps, also pumps for boiler feed, mines, floating dry docks and graving docks. Detailed specifications of the pumps are given. The drives employed include belt, steam engine, motor and Alberger-Curtis turbine.

Pyrometric and Electrical Precision Instruments.—Pyrolectric Instrument Co., 636 East State Street, Trenton, N. J. Bulletin 7. Illustrates and describes pyrometric and electrical precision instruments. These include a high frequency induction furnace, pyrovolter, cold junction devices, thermocouples, millivolter, microvolter, galvanomter, etc.

Magnetic Chucks.—Taft-Pierce Mfg. Co., Woonsocket, R. I. Bulletin 107, 31 pages, 8 x 10½ in. Explains the magnetic circuit and details of construction of magnetic work-holding chucks. Numerous views showing the chucks installed on a lathe, milling machines, grinders, planers, etc., are included.

Grinding, Polishing and Tapping Machinery.—St. Louis Machine Tool Co., 2607 S. Broadway, St. Louis. Catalog 16, 24 pages, 8½ x 11 in. Concerned with heavy floor grinders, grinders of self-contained type, grinders for detached countershafts, polishing machines and tapping machines. The various machines are illustrated.

Refractory Fire Sand.—Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. Folder. Describes Carbosand, a refractory granular material for making rammed-in linings, special tile, patches and repairs in furnace structures. Applications of the sand are shown.

Centrifugal Pumps.—Allis-Chalmers Mfg. Co., Milwaukee. Catalog, 50 pages, 8 x 10½ in. Concerned with split casing, double suction, single stage, horizontal shaft, centrifugal pumps, made in two types, one for moderate to large capacities against moderate to relatively high heads, the other for higher heads; also horizontal multi-stage centrifugal pumps. Various types of drives are employed. The catalog is profusely illustrated.

Slide Rule.—Knief & Co., 4168 West Twenty-fifth Street, Chicago. Leaflet. Concerned with a 10-in. Mannheim rule made with standard and special scales; also folding pocket rule, and combination caliper.

Industrial Finances

The stockholders of the Heald Machine Co., Worcester, Mass., have voted to increase the capital by an issue of 2500 shares of 7 per cent cumulative preferred stock having a par value of $100 each. Of the new issue, 2000 shares are to be issued at once for cash at $100 each. The remaining 500 shares are to be issued as and when the directors of the company shall determine. Paul B. Morgan is president and James N. Heald treasurer.

Charles Koegel's Sons, Inc., Holyoke, Mass., with a capital of $60,000, has been incorporated under Massachusetts laws for the purpose of taking over the business now carried on by Wilhelmina Koegel under the firm name of Charles Koegel & Sons, which has the same capitalization as the new company. The firm manufactures and sells paper, wire and coating mill machinery. Herman I. Koegel, 80 Hitchcock Street, Holyoke, is president of the new company.

The General Electric Co. directors have authorized a special issue of 15-year 6 per cent debenture bonds, dated Sept. 1, 1919, in denominations of $50, $100, $500 and $1,000. These bonds together with Victory 4¾ per cent notes, will be offered for subscription to employees in service one year or more in amounts not exceeding $1,000.

A special meeting of stockholders of the Supreme Motors Co. has been called for Jan. 5 to change the principal offices of the company from Cleveland to Warren, Ohio, where its plant is located and to increase its capital stock by $1,000,000, divided $600,000 preferred and $400,000 common.

The firm of Wilbur & Cannon, 118 Circle Road, Syracuse, N. Y., manufacturer of "Wil-Can" carbonizing boxes, has been dissolved and the business and all assets taken over by the Cannon-Stein Steel Corporation, Syracuse, of which Francis P. Cannon of the former partnership is president.

To finance in part construction of a new slag plant, now being built, the Struthers Furnace Co., Cleveland, operating a 500-ton merchant stack at Struthers, Mahoning county, Ohio, has announced the issuance of $1,250,000 7 per cent cumulative preferred stock. In 1869 the Struthers Furnace Co. was organized with $200,000 capital and now has assets valued at $5,000,000, created from surplus earnings. Dividends averaging 12 per cent have been paid the past 12 years on common stock, of which the company has $1,000,000. It has its own ore properties and operates some beehive coke ovens. The company has not had a traveling representative for 34 years, its output being taken by seven consumers.

The Corporation Trust Co., Trenton, N. J., has filed with the secretary of that state a certificate of amendment to the charter of the Chicago Pneumatic Tool Co. increasing the capital stock from $7,500,000 to $13,000,000 by an issue of 130,000 shares having a value of $100 each.

Fairbanks, Morse & Co., Chicago, manufacturers of cranes, engines, pumps, compressors, and miscellaneous machinery will change its capital stock from 25,000 shares of $100 par value to 325,000 shares of no par value. Stockholders will be given 10 shares of new stock in exchange for each share now held. Of the remaining 75,000 shares, part will be sold to officers and employees and part reserved for financing plant and business expansion.

A receiver's sale of the plant and equipment of the Industrial Foundry & Machine Co., Pottstown, Pa., is announced for Feb. 11, at 2 p. m.

The common and preferred shares of the American Steel Foundries outstanding have been listed on the Boston Stock Exchange.

Springfield, Mass., bankers are offering for sale Rolls-Royce of America, Inc., 7 per cent cumulative participating preferred stock at $97.50 per share with the right to pay for same in three installments.

The net earnings of the Vulcan Detinning Co., after charges, for the quarter ending Sept. 30, last, were $14,277, or equivalent to 95c. per share on the preferred stock, and a decrease of $61,090 as compared with those for the corresponding period last year.

The last of the $12,000,000 serial notes issued in March last by the American Can Co. have been retired.

New York bankers are offering for public subscription 120,000 shares of the Locomobile Co. common stock (no par value) at $25 per share.

Stockholders have authorized an increase in the American Bosch Magneto Co. capitalization from 60,000 to 100,000 shares, no par value. The directors, within six months, will offer half of the new shares to stockholders at $100 per share and 5000 shares to employees at the same price.

The Bassick Co., Bridgeport, Conn., is issuing $500,000 7 per cent preferred cumulative stock to provide funds with which to buy the Alemite Co., Chicago, which has perfected a method of automobile lubrication. The Bassick company was incorporated two years ago and took over the M. B. Schench Co., Meriden, Conn., the Universal Caster & Foundry Co., Newark, and the Burns & Bassick Co., Bridgeport, Conn.

The Vanadium Corporation of America has acquired the properties of the Primos Chemical Co., and in connection with the deal is to offer 93,334 shares of new stock for subscription at $45 a share to finance the purchase.

It is proposed to reorganize the Union Twist Drill Co., Athol, Mass., through the formation of a new Massachusetts corporation, which will include the assets of the Union Twist Drill Co. and also those of the S. W. Card Mfg. Co., Mansfield, Mass., and of Butterfield & Co., Derby Line, Vt., which two latter corporations the Athol company controls through stock ownership. The capitalization of the new company will be $3,129,600, divided between $2,379,600 7 per cent preferred of $100 par value, and $750,000 common, par value $5. Holders of present preferred stock will receive either $100 cash or share for share of the new preferred. The common stockholders will have the option per share of one-half share preferred stock, 10 shares of common stock and the right to subscribe for two shares of common at $20 per share; or of one-tenth share of preferred and 12 shares of new common. Of the common $150,000 is offered to common stockholders for cash, and $25,000 is reserved for issue to employees.

All of the $3,000,000 Detroit Motor Car Co. 7 per cent preferred stock, recently offered for public subscription, has been sold.

American Bosch Magneto Corporation stockholders on record Jan. 5, will have the right to subscribe to 20,000 shares of new stock at $100 per share, in the ratio of one for three shares. The offer expires Jan. 21.

Joseph O. Procter, Jr., trustee in bankruptcy, announces that the Ames Plow Co., first mortgage 5 per cent bonds due July, 1932, will be paid at par and interest upon presentation at the Old Colony Trust Co., Boston.

The November net income after allowing for taxes, depreciation, etc., of the Gulf States Steel Co., was $110,602, as compared with $53,370 in October.

The Illinois Steel Co., Chicago, has certified to the Secretary of State of Illinois a change in the capital stock of the company from $50,000,000 to $18,700,000.

Industrial corporations in the Youngstown, Ohio, district distributed about $2,500,000 in dividends Jan. 1, iron and steel companies leading in the disbursements. The Youngstown Sheet & Tube Co. paid 3 per cent on common stock and the Brier Hill Steel Co. and Trumbull Steel Co. each 2½ per cent. Each paid 1¾ on preferred.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	4.00c. to 4.25c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 4.00c.
1 to 6 in. x ⅜ to 1 in	3.52c. to 4.00c.
1 to 6 in. x ¼ to 5/16	3.62c. to 4.00c.
Rods—⅝ and 11/16	3.57c. to 4.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 4.75c.
Hoops	4.47c. to 5.50c.
Shapes:	
Beams and channels—3 to 15 in	3.47c. to 3.75c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 3.90c.
3 in. x 3/16 in. and ⅛ in	3.72c. to 4.25c.
1½ to 2½ in. x ⅛ in	3.52c. to 4.05c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 4.00c.
1 to 1¼ in. x 3/16 in	3.52c. to 4.45c.
1 to 1¼ x ⅛ in	3.57c. to 4.50c.
⅞ x ⅞ x ⅛ in	3.62c. to 4.60c.
¾ x ⅛ in	3.67c. to 4.65c.
⅝ x ⅛ in.	4.07c. to 5.00c.
½ x 3/32 in.	5.17c. to 5.70c.
Tees:	
1 x ⅛ in	3.87c. to 4.75c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 4.50c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 4.10c.
3 in. and larger	3.52c. to 3.95c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	3.52c. to 4.00c.
Toe calk, ½ x ⅜ in. and larger	4.35c.
Open-hearth spring steel	7.00c.
Standard cast steel, base price	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 4.00c.

Sheets

Blue Annealed

	Per lb.
No. 10	5.07c. to 5.80c.
No. 12	5.12c. to 5.85c.
No. 14	5.17c. to 5.90c.
No. 16	5.27c. to 6.00c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	6.30c. to 6.80c.	——
Nos. 22 and 24	6.35c. to 6.85c.	7.80c.
No. 26	6.40c. to 6.90c.	7.85c.
No. 28	6.50c. to 7.00c.	8.00c.
No. 30	6.60c. to 7.20c.	——

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	6.75c. to 8.50c.
No. 16	7.00c. to 8.75c.
Nos. 18 and 20	7.15c. to 8.90c.
Nos. 22 and 24	7.30c. to 9.05c.
No. 26	7.45c. to 9.20c.
No. 27	7.60c. to 9.35c.
No. 28	7.75c. to 9.50c.
No. 30	8.25c. to 10.00c.

No. 28, 36 in. wide, 20c. higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per lb.
Bright basic	7.50c.
Annealed soft	7.50c.
Galvanized annealed	8.00c.
Coppered basic	8.00c.
Tinned soft Bessemer	9.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29½c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$8.80	$8.55
		90 lb....	8.90	8.65
		100 lb....	9.00	8.75
IC...$15.00	$13.00	IC...	9.25	9.00
IX... 17.25	15.00	IX...	10.25	10.00
IXX... 19.00	16.75	IXX...	11.25	11.00
IXXX... 20.75	18.50	IXXX...	12.25	12.00
IXXXX... 22.25	20.25	IXXXX...	13.25	13.00

Terne Plates

8-lb. Coating 14x20

100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	65c. to 68c.
Bar	70c. to 75c.
American pig, 99 per cent	57½c. to 59c.

Copper

Lake ingot	22c. to 23c.
Electrolytic	21c. to 22c.
Casting	20½c. to 21c.

Spelter and Sheet Zinc

Western spelter	10½c. to 11½c
Sheet zinc, No. 9 base, casks	13½c. open 14c.

Lead and Solder*

American pig lead	9½c. to 10½c.
Bar lead	10½c. to 11 c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c.
Commercial grade, per lb	50c.

Antimony

Asiatic	11½c. to 12½c

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	35c. to 38c

Old Metals

The market is firm. Dealers' buying prices are nominally as follows:

	Cents Per lb
Copper, heavy and crucible	17.5
Copper, heavy and wire	16.5
Copper, light and bottoms	14.5
Brass, heavy	11.0
Brass, light	8.0
Heavy machine composition	16.0
No. 1 yellow rod brass turnings	10.0
No. 1 red brass or composition turnings	13.0
Lead, heavy	6.75
Lead, tea	4.50
Zinc	5.50